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USSR Report

SCIENCE AND TECHNOLOGY POLICY

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CONTENTS

BOOK ON CEMA SCIENCE, TECHNOLOGY INTEGRATION REVIEWED

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 83 pp 87-88

[Review by G. Klimko, professor, doctor of economic sciences, and V. Lukashenko, candidate of economic sciences, of book "Razvitiye nauchno-tekhnicheskoy integratsii stran-chlenov SEV" [Development of the Scientific and Technological Integration of CEMA Member Countries] by V. Ya. Mashtabey, Kiev, Naukova Dumka Press, 1981, 163 pp]

[Text] The book reviewed here analyzes the key components of the scientific and technological integration of the member countries of CEMA as a dynamic system. The author accomplishes this analysis by progresing from an examination of conceptual problems to an investigation of the process of the development of the science and technology structures of discrete countries as linked to the possibilities for mutual cooperation among CEMA members. Thereupon, the author assesses the implementation of these possibilities at the level of direct executors (ministries, departments, scientific research institutes, design bureaus).

The author uncovers the objective premises of the formation, and problems of the further development, of international specialization and cooperation in science and technology. He also analyzes such problems of science and technology development in and cooperation of CEMA member countries as the evolution of national science and technology policies, the streamlining of the management of scientific and technical progress, the formation and utilization of science and technology potential, and international exchange of achievements of science and technology.

Thus, the monograph analyzes the complex whole of the problems of scientific and technological integration from the standpoint of interrelationships within the "science-technology-production-exchange" chain, with allowance for both national and international interests.

The aims which the author set himself in his monograph have on the whole been accomplished felicitously, thus markedly distinguishing this work from a number of other studies illuminating the problems of the scientific and technological integration of CEMA member countries. The monograph offers a comprehensive analysis of the concepts of "scientific and technological potential evolved by specialists from CEMA member countries. As the author points out, there is an explicit unanimity of approaches to this problem. The theory and practice of the solution of the problems of the management of scientific and technological potential in the CEMA member countries reveal two

fundamental treatments of this problem: theoretical and empirical. The former meets to a greater extent the requirements of a systemic approach and contributes to unifying the concepts of the scientific and technological potential of different CEMA member countries. The latter treatment, based on existing indicators of the parameters of R&D and experimental work, serves even now to solve urgent problems of the analysis of the development and utilization of the scientific and technological potential of the CEMA member countries. At the same time, it contains more of the specific national element conditioned by the special features of the management of R&D work in every individual country. At present the CEMA member countries increasingly lean toward inter preting the concept of the scientific and technological potential in terms of a synthesis of both these treatments.

The author proposes a method for evaluating the development levels of the parameters of scientific and technological potentials of the CEMA member countries. This method is to a certain extent suitable for constructing a yardstick for the measurement of the levels of divergence of these parameters in both the static and the dynamic modes.

The author believes that, as traditionally formulated, the problem of the rapprochement and equalization of the development levels of the parameters of scientific and technological potentials of these countries may retain its principal importance until roughly the 1985-1990 period, after which the emphasis in the science and technology policies of these countries should justifiably shift in the direction of specialization and cooperation in R&D work.

The book also presents a number of original calculations confirming and substantiating the author's various theoretical formulations. Thus, in particular, the conclusions and statements concerning the development of international specialization and cooperation in R&D work are based on calculations of the development levels and rates of rapprochement of the parameters of the scientific and technological potentials of CEMA member countries, as well as on the comparative effectiveness of the implementation of different variants of their national science and technology policies. It also provides comparisons with the development levels of discrete parameters of the scientific and technological potentials of the member countries of the Common Market, the United States and other developed capitalist countries.

In accordance with his chosen approach, the author also pays attention to aspects of the effect of the scientific and technological integration of CEMA member countries on the implementation of output and foreign-trade programs, as well as to the extent of that effect. A novelty here is the attempt to shed light on the basic range of questions linked to the scientific and technological preparation of production for export.

It is already becoming sufficiently obvious, the author stresses, that scientific and technological progress as well as concentration of production, reinforced by the processes of the scientific and tehnological revolution, have led the economy of the Soviet Union, and its export sector as well, toward a milestone at which the integ ation of science, production and exchange becomes extremely needed. This conclusion also applies to other CEMA member countries. What is more, some of these countries already have gained a certain experience in such integration. The work points out that, owing to

these objective causes, there is a need for a deliberate formation of new types of organizational structures capable of exploiting the advantages of this integration, as well as of their operating mechanisms as based on the requirements of the organization of marketing goods on the foreign market.

The monograph is not free of drawbacks. Its sections dealing with the management of scientific and technological progress in CEMA member countries on the basis of increasing the effectiveness and quality of R&D work are somewhat too fragmentary and excessively descriptive; this also applies to the sections dealing with the practice and problems of the mutual exchange of patents and licenses.

At the same time, the monograph is an original scientific study that is of importance to not only theory but also practice. It represents a definite contribution to the treatment of the problems of the scientific and technological integration of CEMA member countries.

1386
CSO: 1814/97

NEW FORM FOR BRINGING TOGETHER SCIENCE AND PRODUCTION

Kiev TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA in Russian No 1, Jan-Mar 84 pp 1-3

[Article by Ye. V. Gol'mova, engineer: "A New Form for Joining Science and Production"]

[Text] A greater and greater role is being played by VUZ science in resolving the most important tasks of accelerating scientific and technical progress as a foundation for creating a material and technical base for communism and raising the standard of living of the Soviet people; this branch of science has at its disposal highly skilled personnel and the necessary experimental base. The 26th CPSU Congress called for implementation of specific measures directed at improving the forms of contact between science and production, stepping up the incorporation of scientific achievements into the national economy, and increasing the efficient utilization of the scientific potential of higher education institutions.

Educational-scientific-production associations that are formed and function on the basis of VUZ's meet these demands most fully. Practically every link in the research-production cycle is included in the structure of these associations: there are scientific research subdivisions, design and technological organizations, as well as enterprises and production associations.

Educational-scientific-production associations have been created and are functioning successfully in the RSFSR, the Ukraine, Belorussia, Lithuania, and a number of other republics. At the end of the 10th Five-Year Plan there were 11 such associations in Odessa, using as a base the state university, the polytechnical institute, the food and refrigeration technological institutes, the national economic institute, and so on. The creation of an educational-scientific-production association makes it possible to work jointly on solving problems such as providing scientific and technical assistance for the country's national economy, training specialists for base enterprises, increasing production efficiency and product quality, and improving and strengthening the material base of scientific research work. VUZ scientists participate in holding science days at production sites and leading specialists at enterprises speak to students and the teaching staff, making an active effort to draw students into production management and to encourage them to do their degree work in this area.

Every educational-scientific-production association operates in accordance with the Provision, worked out jointly by all the organizations included in the association and approved by the UkSSR Ministry of Higher and Secondary Specialized Education and by the appropriate industrial ministries. The basic directions of the work done by educational-scientific-production associations are: to draw scientists and highly skilled production specialists into the educational process, to improve the practical training of young specialists, to carry out specific scientific research work to meet the needs of production, to raise the theoretical level of engineering and technical personnel with the help of the teaching staff, to carry out joint measures in the area of political education, and so on.

The Odessa VUZ's that are included in educational-scientific-production associations have had positive results in practically all of these directions. For example, during the 10th Five-Year Plan scientists at the Odessa Polytechnical Institute, together with engineering and technical personnel from three associations (the "Pressmash" [Press Machinery] Production Association, the "Kislorodmash" [Oxygen Equipment] Scientific Production Association, and the "Tochmash" [Precision Machinery] Production Association) successfully carried out scientific research work and experimental design work valued at more than 1 million rubles. In the final year of the 10th Five-Year Plan alone the results of 21 finished projects were incorporated into production for an economic effect of 256,000 rubles. Students at the Odessa Polytechnical Institute wrote 284 theses on the subject of educational-scientific-production associations; and 10 inventions were developed in conjunction with production workers. Of the institute's graduates who did their practical work at enterprises that were members of an educational-scientific-production association, 153 young specialists took permanent positions at these same national economic projects.

Educational-scientific-production associations have an effective influence on practically all factors in production. For instance, during the 11th Five-Year Plan the educational-scientific-production association that includes the Odessa Polytechnical Institute and the "Kislorodmash" Scientific Production Association has started to implement a joint plan for introducing progressive, low-waste manufacturing methods. In 1982 VUZ scientists, in conjunction with engineering and technical personnel and workers from the "Avtogenmash" [Autogenous Machinery] Plant, the production link of the scientific-production association, developed and introduced a method for obtaining stampings of parts made of cross-wedge rolled metal. This made it possible to increase labor productivity by a factor of more than 10, and to reduce the use of metal for each article by more than 40 percent while increasing the durability by 25-30 percent. The need for operations such as lathe finishing and grinding was eliminated, since the rolled metal stampings are as close as possible to the finished article.

Now scientists at technical VUZ's and plant workers have a card file of more than 130 parts that can be manufactured using this cross-wedge rolled metal method. Full implementation of this method will make it possible to reduce the annual labor consumption of the production program by 166,800 norm-hours, to save 190 tons of metal, and to obtain an economic effect of 270,300 rubles.

Also within the framework of this educational-scientific-production association, during the 10th Five-Year Plan a 30-person creative brigade of scientists from the institute and engineering and technical personnel from the plant carried out joint research on developing a new design for nozzles with rotators for cutting metal with oxygen. The results of this work made it possible to reduce the width of the cut and consequently, to make a 30 percent reduction in the loss of metal during this process. The resulting economic effect was over 800,000 rubles.

Odessa State University imeni I. I. Mechnikov has gained a great deal of positive experience in organizing the operations of educational-scientific-production associations. Two of these associations have been operating successfully for a number of years here: The Odessa State University-"Odeskabel'" [Odessa Cable] Association and the Odessa State University-"Melioratsiya" [Land Reclamation] Association (the latter is a complex that includes, in addition to Odessa State University, subdivisions of the Odessa Agricultural Institute, the oblast water and land reclamation station, and the Kolkhoz imeni Michurin in Kiliyskiy rayon).

During the 10th and 11th Five-Year Plans, scientists at the university and cable specialists developed fundamentally new instruments for determining product quality--vortical laser fault detectors--which are protected by 10 patents. Use of these instruments has provided an economic effect of 2.5 million rubles at the "Odeskabel'", "Moskabel'" [Moscow Cable], "Tashkentkabel'" [Tashkent Cable], and "Moldavkabel'" [Moldavian Cable] Plants, and to certify 15 types of products for the state Emblem of Quality.

Within the framework of the "Melioratsiya" educational-scientific-production association, scientists and soil specialists developed highly effective measures to increase the yield of agricultural crops and to improve the fodder base.

Between 1976 and 1981 within the framework of educational-scientific-production associations Odessa's VUZ's introduced 35 different developments with an economic effect of 12 million rubles. The economic impact of incorporating the results of scientific research work or experimental design work alone was 342,800 rubles, which exceeds the average indicator achieved throughout the USSR Ministry of Higher and Specialized Secondary Education. More complete and prompt introduction of developments into production is an important social and economic factor. Over 90 percent of the finished projects are introduced within 3 years after the research has been done.

The results of developments worked out within the framework of educational-scientific-production associations are introduced over a broader geographical area than when there are direct ties between VUZ's and production. An example of this can be seen in the Odessa State University-"Odeskabel'" educational-scientific-production association. The technical innovations developed using the Odessa Cable Plant as a base are being implemented successfully at five of the sector's enterprises which form the nucleus of the country's cable industry.

New and better forms for uniting science and production are being pursued using the experience of the educational-scientific-production associations that have been created and are in operation; and voluntary efforts to strengthen these ties are undergoing further development.

Educational-scientific-production associations are an important link in the process of turning science into a direct production force in society, and in combining the achievements of the scientific and technical revolution with the advantages of the socialist system of economic management.

9967
CSO: 1814/100

ROLE OF SCIENTIFIC AND TECHNICAL SOCIETIES DETAILED

Kiev TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA in Russian No 1, Jan-Mar 84 pp 58-60

[Article by A. P. Lyubchenko and S. S. Tolmachev: "Organizations of the Machine Building Scientific and Technical Society: The Work Being Done by the Primary Organization of the Scientific and Technical Society to Strengthen Ties between Science and Production"]

[Text] The primary organization of the Machine Building Scientific and Technical Society at the "Zavod imeni Malyshev" [Plant imeni Malyshev] Production Association (in Kharkov) is devoting special attention to strengthening ties between science and production in its work to carry out the comprehensive program for accelerating scientific and technical progress that was outlined by the CPSU.

During the 11th Five-Year Plan the motto of this work is: "Obtain the greatest yield from our production and scientific potential."

The most important form used to unite science and production by the association's scientific and technical society is the signing of agreements for creative cooperation between the association and various institutes.

In 1981 38 agreements were signed with 30 scientific research institutes and VUZ's. The goals of 21 agreements have been met, with an economic effect of 240,000 rubles. In 1982 the number of agreements rose to 55; the work called for in 35 of the agreements was fulfilled, with an economic effect of 685,000 rubles.

In 1983 52 agreements were signed. The expected economic effect is 1 million rubles.

In the process of carrying out the work called for, in conjunction with scientists from the institutes, seminars, conferences and joint consultations are held, and publications are prepared.

The association has the closest creative ties with the Kharkov Polytechnical Institute; it has signed agreements on 13 different topics with the institute. Among these is an agreement on creative cooperation between the scientific and technical societies of the Kharkov Polytechnical Institute and the "Zavod imeni

Malysheva" Production Association for the 11th Five-Year Plan. This agreement calls for joint scientific research work on 25 different topics. The institute has promised to organize an annual lecture series at the association's university for scientific and technical progress, and to participate in science days at the association. The association has promised to send 10-15 of its workers every year to study at the institute; to give the institute's students an opportunity to do their practical training; to select topics for thesis projects and collect materials to help students who are studying in the evening and correspondence departments plan their thesis work; and to participate in scientific and technical conferences held by the professors and teaching staff.

The agreement also calls for preparation of joint publications on the most important research results, discussion of the course and results of joint scientific research at the departments' or association's technical councils, and publication of a collection of scientific and technical articles.

The scientists' council at the association enjoys the same rights as sections of the scientific and technical association's council, of which there are eight: there is a design section, a technology section, a diesel section, a welding section, a metallurgy section, an instrument section, a mechanization and automation section, and a section for working with youth.

The most important work done by the diesel section includes creation, finishing, and conducting interdepartmental tests on a the 3D70 diesel-electric unit; increasing the life of the D100 diesel generators; and developing a long-term stationary 6000-8000 horsepower diesel generator. This year the section has reviewed the results of research on reducing the rated revolution frequency of the crankshaft on the 3D70 diesel from 1000 to 850 rpm; and on creating a system for automated planning.

Other sections of the scientific and technical society's council have also done scientific research taking into account the demands of production. For example, in 1983 the welding section worked on creating welding materials, on manufacturing methods, and developing smelting conditions for crane wheels; it also studied the processes and technology of plasma and diffusion welding. The instrument section introduced processes for strengthening cutting instruments using a carbonitration method. The metallurgy section worked on questions involving the selection of optimal designs for furnaces and a technological model for smelting, refining and casting for the reconstructed section of aluminum smelting. The technology section introduced a hard-alloy mortising tool for cutting teeth into cogwheels.

The work done by these sections is coordinated closely with plans for introducing new technology and for experimental design work.

The scientific and technical conferences held by the council of the scientific and technical society help incorporate scientific and technical achievements into production and to strengthen ties between science and production.

Recently, four scientific and technical conferences have been held:

"On introducing into the association low-waste technology for manufacturing precision castings and finished parts";

"On improving the quality of casting and the level of control over casting operations";

"The technical and economic level of production in the association and goals for raising the level of mechanization and automation of production processes and reducing the use of manual labor" (in conjunction with the association's production and technical council);

"Organization of quality control for materials and machinery parts produced by the association. Scientific, technical, and organizational suggestions for introducing contemporary nondestructive methods for materials quality control."

Two scientific-technical seminars have been held: "On improving the reliability of the cylinder-piston group on the 10D100 engine and eliminating trouble spots" and "The experience of and prospects for introducing machine tools with numerical program control and robots in the association during the 11th Five-Year Plan."

The materials from the scientific-technical conferences and seminars are published in the large-circulation plant newspaper MASHINOSTROITEL'.

The council of the scientific-technical association regularly organizes public reviews and contests. Prizes were awarded for 8 projects (30 people) according to the results of the reviews for the best organization of a shop or department in the society for an effective technical solution to reduce the proportion of manual labor.

A total of 17 combined creative brigades have been formed that include scientists, specialists, and workers; they have resolved a number of scientific and technical problems and they have introduced new progressive manufacturing processes.

The following data offer evidence of the high level of work that is being done: in 1982 128 applications were submitted for inventions, 92 of which were approved; 55 inventions and 3762 rationalizers' proposals were incorporated into production, with an economic effect of about 3 million rubles. The association's scientists played a key role in this work, since they submitted more than 50 percent of the applications for inventions.

A total of 295 creative cooperation brigades have been created within the association, which include 1273 people. A contest "For technical progress at each work place" has been organized between these brigades and the engineering and technical personnel. A provision has been developed for the creative cooperation brigades. An economic effect of 980,000 rubles has been obtained from the measures that have been carried out.

At its meetings, the scientific and technical society's council considers questions involving the further development of creative cooperation among workers in science and production, the status of scientific and technical work being done by the sections, the work of joint creative brigades, the competition among the engineering and technical personnel based on creative plans, and so on. Responsible members of the society's council are assigned to each direction of the society's activity.

9967
CSO: 1814/100

PATENT SYSTEM USED TO IMPROVE QUALITY

Moscow TRUD in Russian 8 Jan 84 p 2

[Article by Ye. Aleksandrov, Tallinn - Moscow; "The Tallinn Variant"]

[Text] The Punane Ret plant and a special design bureau, which was located in Tallinn, were combined several years ago. Before this, they operated within one ministry, but were subordinate to different main administrations. The special design bureau designed radio electronic equipment, and the plant manufactured it, including the Estonia Stereo Radio Phonograph which is well known to many. The production of this enterprise was not so bad but -- let us say right out -- it nevertheless was inferior to the best foreign models. When the association was organized, Petr Prokhorovich Mel'nik, the general director, came to the designers and said that matters would not go along this way any further. The Ret plant would have to move to no less than the world level and possibly exceed it. How? Mel'nik suggested that the designers think about this and set a month as the period for doing it.

Time passed and the designers submitted their recommendations. One of them: to work from now on not according to models but according to patents, especially interested the general director.

How is new equipment sometimes developed? Prospectuses with a description of the innovations are sent to interested engineers in the field, and then they try to get operating models, examine them and see how everything is made. Then, they begin to think about what can be used in their construction, what can be copied and what can possibly be improved. This is the traditional way. Equipment appears which is essentially not new although it works better than that which it replaces.

The recommendation of Toomas Lumi, a young electronic engineer, was directed against this approach. What was its essence? When someone finds a new technical solution, he immediately announces his priority to it, writes an application and, if the experts find this solution to be really an original one which is not being used anywhere, a charter of immunity is issued -- an author's certificate in our country or a patent abroad. In a word, the author's certificate and patent appear much earlier than the production of the innovation begins. If one skillfuly and carefully follows the patent documentation, it

is possible not to lose time on studying the prospectus and working to reproduce models that are already being made. In order to "catch" the necessary information and use it in the best way, however, a special service is required which would be capable of establishing in what directions inventive thinking is working today and forecasting where we should look in order to achieve the best effect. A research service is needed.

The association's general director understood the value of the idea in an instant and established such a service without losing time. Lumi was appointed the director although he was only 25 years old and was the youngest department director not only in the enterprise but, as they told me, in the other enterprises of the main administration. This did not disturb Mel'nik.

He entrusted the chief of the new department with selecting people exclusively according to his own tastes. Besides a polytechnical institute where he received the specialty of an electronic engineer, Lumi himself had recently completed another one -- the Central Institute for Raising the Qualifications of Patent Workers which had been established by the USSR State Committee for Inventions and Discoveries. He selected engineers, who also had a patent education, for his department. This was very important. Only individuals, who know all the fine details of the matter, can work effectively with patents.

The new Ret department began to forecast the development of technical innovations and to direct them. Six people were engaged in this. A stream of inventions gushed out after several years. Naturally, the question arose: How could one use them and put them at the service of production in the shortest time? You see, an author's certificate is by itself only a piece of paper.

The general director went to Moscow. He needed staff for another department -- to accelerate the incorporation of the innovations. He told the ministry about which inventions had already been made and in what directions work was being performed. He received a "good". The formation of the new service was entrusted to another specialist-- Toma Pungas, an honored inventor of the Estonian SSR and a very active worker from that same special design bureau which had been combined with Ret. Thus, a department for the accelerated incorporation of inventions -- 60 people: designers, technologists and workers -- appeared in the association. Specialists were needed so that drawings, formulated in accordance with all the rules of an all-union state standard, would not be expected. Drafts were another matter. An idea arose -- pounce on the drafts and send them to Pungas who had designers and technologists to manufacture everything quickly and to construct a test model. That, which formally had taken years, became possible to do in three months. This was the period established for preparing test models. I will mention in passing that it became possible with the appearance of this department to begin the production of new items after about a year and a half (no more!) after their idea arose. This period was also set. They began to update the variety of products quickly in the association.

I once asked Mel'nik where he himself saw the reason for the success.

"An intelligent policy in using the latest achievements of scientific and technical thinking is required. The talents of our people must be engaged. The directors of enterprises and institutions must display a concern for the fact that they do not go for naught. The main thing depends on them."

The last census showed that in more than half of the industrial enterprises the patent service consisted of ... one individual. Does it seem that this can be done without and at the same time produce items which will appear on the list of new ones? The whole matter is obviously here. At the same time, there are figures. Only 32 of the 154 important inventions, which the USSR State Committee for Inventions and Discoveries recommended for inclusion during 1982 in the state plan for the development of science and technology, got into that plan; and only 119 of the 1,025 recommended inventions -- into branch programs. It is not surprising that 60 percent of the technical items, which should have been put into production during the last two years, did not contain inventions. However, if a machine contains no fundamentally new technical solutions, what makes it new?

During the December 1983 CPSU Central Committee Plenum, very serious attention was paid to solving the problem of labor productivity in the national economy. This means that it is necessary to develop new and highly productive equipment and technologies. Yuriy Vladimirovich Andropov pointed out: "A great deal will depend on how we mobilize the collectives of enterprises and scientific research and design organizations and engineer, technical and scientific personnel to accelerate scientific and technical progress. This task is of primary importance." The Tallinn lesson shows along what path it is possible to move. Has not the time come for the USSR State Committee for Science and Technology and the State Committee for Inventions and Discoveries to develop an accurate system of measures which would permit equipment not to be considered new if there were no unique effective approach in it?

8802
CSO: 1812/92

IMPORTANCE OF UTILIZING VUZ SCIENTIFIC RESEARCH STRESSED

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIYA 6: EKONOMIKA in Russian No 5 Sep-Oct 83 pp 32-37

[Article by S. M. Basharina and V. I. Igitov: "Problems of Sectorial, Intersectorial and Regional Economics: Utilizing the Results of Scientific Research Work by VUZ's"]

[Text] The current stage of economic construction in the USSR and implementation of the task of intensifying public production in every possible way stipulated by the Communist Party urgently require solution of problems related to acceleration of the rates of development of science and technology. "The party and the state look to economists, philosophers, historians, sociologists, psychologists and lawyers for the development of reliable ways to increase production efficiency..."[1] it was noted at the June (1983) CPSU Central Committee Plenum.

The rates of progress of science and technology and the shortening of the "science-production" cycle depend on efficient organization of every stage in this cycle, including the introduction stage. In this regard, introduction of scientific research results is becoming an extraordinarily important task these days, and the necessity is arising to resolve theoretical and practical problems related to organization of both the process of introduction and the system of managing this process.

A great deal of attention is being devoted in the economic literature to analysis of the problems of managing scientific and technical progress as well as to problems related to the introduction of scientific achievements. However, the works basically examine the problems of utilizing developments carried out by sectorial scientific research organizations, and not enough is published on the problems of utilizing results of scientific work by employees of the higher school and introducing results of their research into production. Moreover, the higher school is assigned one of the most important places in implementing the measures to accelerate scientific and technical progress stipulated by the Communist Party and the Soviet Government. In carrying out the decisions of the 25th and 26th CPSU congresses on development of scientific research in higher educational institutions, the country's VUZ's have achieved outstanding successes in recent years in increasing scientific and technical potential and

expanding the scope and increasing the efficiency of scientific research work. Higher educational institutions now are being transformed into intersectorial scientific research complexes, capable of conducting work in all fields of knowledge and successfully working out many problems of an applied nature. Thus, about 60,000 developments carried out by collectives of universities and institutes were introduced into industry in just the years of the 10th Five-Year Plan.[2]

Nevertheless, the scientific achievements of higher educational institutions and their scientific research capabilities are far from being fully utilized. One of the reasons for this is the inadequacy of the system of managing the utilization of research results. There is also no single opinion with regard to definition of the concept of "utilization" and "introduction" of the results of scientific research work, which does not make it possible to work out a single conception of the problem of calculating the results of VUZ research and its effectiveness.

In published scientific writings the problem of introduction is considered as a definite junction between a completed scientific development and production. For example, B. Bazov considers scientific developments or inventions introduced if they are employed at one enterprise.[3] Authors of the monograph "Management of Scientific Progress" view introduction as the process of practical implementation in production of new developments, considering the beginning of introduction as the moment that a decision on production of new equipment is approved; L. I. Udarova identifies introduction with the technological preparation of production; and G. M. Glagoleva brings in the concept of "technological assimilation of scientific discoveries and developments," considering it realization of "scientific knowledge in the national economy, putting a scientific idea in a form which makes it possible to utilize it in an appropriate production process"; "technological assimilation of scientific discoveries and developments embraces both the links of science and the links of production"[4]; G. M. Glagoleva, in essence, considers "introduction" as V. I. Kushlin does, in the broad and narrow sense of the word. "Introduction" in the broad sense is considered in the meaning of the "research-production" process, which begins in the midst of purposeful basic research so that it would be able to exert influence on the course of realization of the latest and most important achievements of science... The "research-production" cycle should conclude with the mass distribution of the new products or processes, since only on the basis of broad and rapid distribution of innovations can the socioeconomic advantages of each scientific achievement be fully utilized." In a more narrow sense, "introduction" is the process of the direct assimilation of scientific developments.[5]

In viewing the bringing of scientific achievements up to mass (or series) production as introduction, it is expedient to consider that, with respect to the results of scientific research work conducted in higher educational institutions, in virtue of the heterogeneity of the structure of a product of scientific labor, the concept of "utilization," which is taken to mean any employment of data and results acquired in the process of research work, is more acceptable.

In fact, basic research, the role of which has increased significantly under conditions of the scientific and technical revolution, is being conducted on a large scale in the higher school. The basic results of conducting such research are new scientific concepts and discoveries, theoretically substantiated and confirmed experimentally, which creates a ground for further development of the physical base of the national economy. One-fifth of all discoveries recorded in the USSR have been made by VUZ scientists. In just the years of the 10th Five-Year Plan, 15 diplomas were received by them.[6] Social sciences and humanities, being based on the theory of Marxism-Leninism, are extending the system of knowledge into the fields of philosophy, political economy, scientific communism, the sciences of management and law and other directions of public life. Part of the results of basic research have been directed at increasing the overall scientific potential of society by virtue of the fact that technical grounds for their utilization have not yet matured. Achievements of separate scientific research in the social sciences field are not introduced directly into production: they contribute to an increase in spiritual wealth and exert a favorable influence on the main productive force--man. The results of theoretical research are used primarily by science itself, like a project start for subsequent scientific research. Only a small part of theoretical work yields immediately practical conclusions which enable them to be rapidly applied in the process of physical production. This relates basically to space research, nuclear energy, electronics and other most important directions of scientific and technical progress.

The applied research conducted in VUZ's should be a direct continuation of basic research. It is aimed at resolving tasks in accordance with their implementation in a specific form. The sum of applied research conducted may be different articles, materials, inventions which can be patented[7], industrial processes, methods of verification and tests of models created, projects to automate and mechanize production processes; different scientific and technical guidance materials: organizational and technical systems, standards, methods of modeling, calculation and project planning, educational methods materials, and the like.

Higher educational institutions also are conducting planning and experimental design studies which provide for the manufacture of fundamentally new equipment and technology which improve upon those which already exist. This work is carried out in accordance with orders from industrial enterprises and organizations.

In accordance with the results of basic and applied research and planning and experimental design operations conducted by higher school scientists, publications are issued and reports are given at congresses, conferences, and so forth. Thus, in 1980 alone, more than 3,000 monographs and 2,500 collections of scientific works were prepared and 130,000 articles were published in Soviet and foreign journals.[8] The publication of methodical materials, writings in the press, and reports at congresses and conferences are proven forms of utilizing the results of scientific research, but unfortunately, as A. I. Shcherbakov maintains, it is the basic form of completing research at the present time.[9]

The results of research work are widely used in the educational process, in writing textbooks, training manuals, and in preparing different methodical materials. Without the wide application of the data of science and technology in the educational process and without active involvement by students in scientific work, it is impossible today to train highly skilled specialists who meet the current requirements of the scientific and technical revolution.

Aspects of utilizing the results of scientific research work by VUZ's may be:

1. Direct introduction into the production process of the results of VUZ work that has been concluded; transmittal to production organizations of blueprints, diagrams and calculations which meet the practical requirements of production.

2. Transmittal of VUZ research results to sectorial planning and research organizations or design bureaus in the form of reports which subsequently, after appropriate planning studies, may be utilized in the production field.

3. Obtaining patents and authorship certificates, and the sale and uncompensated transferral of licenses; publication of results in the form of writings--monographs, books, articles and handbooks, as well as utilization of research results in reports at different conferences.

4. Utilization in the educational process: in the preparation of textbooks and training manuals, in lectures, and in carrying out course and diploma work.

Thus, the concept of "utilization" is broader than "introduction." Introduction of the results of scientific research work into the national economy represents one of the most important forms of utilization. But it is impossible to require that every research be concluded by introduction of its results. The specifics of scientific production are such that obtaining negative results, and the conducting of parallel research, which presupposes that only one research effort will reach the stage of introduction, are quite natural.

Broad utilization of scientific research work by VUZ's in the 11th Five-Year Plan should be aimed to the maximum possible extent at solution of the problems of intensive development of scientific and technical progress by means of involving the powerful potential of the higher school in developing new technological processes in public production.

Higher educational institutions have several channels for broad utilization of the scientific research they complete. Every year the direct ties between the higher school and sectors of industry and production organizations and departments are expanded through the voluntary establishment of educational-scientific-production associations, as well as in the form of economic contracts, contracts for creative socialist cooperation, contracts for the transferral of VUZ scientific and technical achievements, and the conclusion of long-term collaboration between higher educational institutions and sectorial ministries.

For example, 1,060 contracts for creative socialist collaboration have been concluded in the Moscow State University imeni M. V. Lomonosov. The economic faculty alone has been linked by contracts on collaboration with 47 VUZ's and scientific organizations, and is fulfilling economic contracts which total about 1 million rubles.

However, experience which has now taken shape in organizing the link between science and production demonstrates that, in spite of significant progress achieved in recent years in consolidating the collaboration of VUZ's with industry, passive forms of utilizing the results of scientific research work concluded by VUZ scientists still continue to predominate, which significantly deters the higher school from accelerating scientific and technical progress and shortening the "science-production" cycle.

A progressive form of introduction such as contracts for the transferral of VUZ scientific and technical achievements which provide for mutual material incentive and remuneration, for example, is being utilized by enterprises with great reluctance. This is related to the fact that funds to pay for the work performed by the VUZ to carry out such a contract are taken out of the enterprise bonus fund, which deprives them of bonuses. For this reason, a separate fund not connected with that bonus fund, which is intended as incentive for introduction of new technology by workers of an enterprise, should be established to pay for developments transferred from higher educational institutions to industrial organizations and assistance in assimilating scientific and technical achievements.

A great deal of work in organizing broad utilization of the results of higher educational institutions' scientific research work is being conducted by the Main Administration for Scientific Research Work of the Minvuz SSSR [USSR Ministry of Higher and Secondary Specialized Education], particularly the Department of Technical and Economic Substantiations and Introduction (TEO and Introduction) of Scientific Research Work--a specially created unit which organizes the implementation of VUZ research.

All materials which come to the Department of TEO and Introduction, before their formulation and direction to the appropriate organs, which directly determine the further fate of a VUZ development, undergo an appraisal by the scientific community (through commissions of the USSR Minvuz Scientific and Technical Council) and specialists of sectorial departments of the USSR State Committee for Science and Technology (GKNT SSSR), the USSR Gosplan and scientific and technical administrations of sectorial ministries.

The USSR Minvuz has several channels for broad utilization of scientific research carried out by higher school scientists. Developments which have great national economic importance and have been recommended for series production in accordance with the results of interdepartmental tests are sent directly to the USSR Gosplan. Since 1979 the Main Administration for Scientific Research Work of the USSR Minvuz has been preparing and sending the proposals directly to sectorial ministries. On a contact and noncontact basis, their developments are sold abroad through the Vneshtekhnika association of the USSR State Committee for Science and Technology and the Litsenzintorg association of the

Ministry of Foreign Trade. But the USSR Minvuz has particularly strong ties with the Commission for Introduction of Completed VUZ Scientific Research Work attached to the USSR State Committee for Science and Technology, which has been functioning since 1970 and is made up of responsible staff members of the State Committee for Science and Technology, the USSR Minvuz, and directors of the country's leading VUZ's. Recommendations made by the commission may be included in the USSR State Plan for Economic and Social Development for the next year, in plans for production preparation, and in ministries' sectorial plans. If results of the work presented are of great national economic importance and need additional research, they are included in long-range special-purpose programs. Final decision on broad assimilation of new types of products and industrial processes is made by the USSR Gosplan upon recommendation by the State Committee for Science and Technology.

For just 1981 and the beginning of 1982, the USSR Gosplan, the State Committee for Science and Technology and the country's industrial ministries considered more than 600 proposals by the USSR Minvuz in accordance with studies presented by VUZ's.[10] More than 25 industrial ministries, as well as the USSR Gosstroy and USSR Gossnab, are considering the problems of broad introduction into the national economy of the results of VUZ science. Today positive recommendations are made for one-third of the developments proposed for inclusion in series assimilation in the State and sectorial plans for introduction. Many thousands of completed developments received one-time introduction during the same period, which unfortunately does not resolve the problem of accelerating scientific and technical progress, and for this reason the principal task remains broad and multisectorial utilization of them.

It must be noted that many sectorial ministries undervalue the role of VUZ science and do not utilize its scientific research capability adequately, giving preference to scientific research by their own sectorial NII [scientific research institutes], and often do not include higher educational institutions' work, even that which is more effective than sectorial results which have been achieved, in sectorial plans for introduction. Some sectors are reducing the volume of work in VUZ's, and are proposing subject matter of secondary importance.

In order to overcome such a narrow departmental approach toward VUZ research on the part of some sectorial ministries and to eliminate the division of scientific developments into "ours" and "someone else's," it is necessary to bring science and production still closer economically and organizationally. For this the network of educational-scientific-production associations must be developed more widely and interdepartmental scientific production associations must be given broad expansion and development. It is apparent that the need has become urgent to issue an intersectorial normative act which regulates the utilization of the results of VUZ science. Both the problems of planning the introduction of VUZ NIR [scientific research developments] and regulation of the sides' activity in preparing developments for industrial assimilation, as well as patent rights problems, may be resolved in it, in particular.

In order to obtain a large return from VUZ research, the objective conditions of its development must be changed, more closely merging scientific work with the broad practice of socioeconomic development. Then it will "take the shape of practical recommendations and provide well-founded social forecasts."[11]

FOOTNOTES

1. "Materialy Plenuma Tsentral'nogo Komiteta KPSS, 14-15 iyunya 1983 goda" [Materials of the CPSU Central Committee Plenum, 14-15 June 1983], Moscow, 1983, p 70.

2. All-Union Conference of Employees of Higher Educational Institutions in Moscow, 6-8 February 1980 (abbreviated stenographic record), Moscow, 1980, p 32.

3. See B. Bazov, "The Introduction of Scientific Developments and Discoveries --the Way toward Acceleration of Technical Progress," PLANOVOYE KHOZYAYSTVO, 1978, No 8, p 60.

4. L. I. Uvarova, "Scientific Progress and the Development of Equipment," Moscow, 1973, pp 207-208. G. M. Glagoleva, "The Technical Assimilation of Scientific Discoveries and Developments," Moscow, 1977, pp 15-16; Ibid, p 34; "The Management of Scientific and Technical Progress," edited by G. A. Dzhavadov, Moscow, 1978, p 187.

5. See V. I. Kushlin, "Accelerating the Introduction of Scientific Developments into Production," Moscow, 1976, p 2[illegible].

6. Bulletin of the USSR Ministry of Higher and Secondary Specialized Education, Moscow, 1981, No 4, p 30.

7. In just the years of the 10th Five-Year Plan, VUZ scientists of the USSR Ministry of Higher and Secondary Specialized Education received more than 10,000 authorship certificates for inventions and 513 foreign patents, and sold five licensing agreements (ibid, 1982, No 5, p 21).

8. Ibid, 1981, No 10, p 27.

9. See A. I. Shcherbakov, "The Effectiveness of Scientific Activity in the USSR," Moscow, 1982, p 67.

10. See S. M. Basharina and V. I. Igitov, "Improving the Organizational Structure of the Administration of Scientific Research Work," summary of report at the All-Union Scientific and Technical Conference "Improving the Economic Mechanism in Sectors of Industry," Section 2, Moscow, 1982, p 42.

11. "Materialy ..." op. cit., p 70.

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CSO: 1814/103

IMPROVEMENT OF ENGINEERING TRAINING STRESSED

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 30 Nov 83 p 2

[Article by Yu. Lezin, Rector of the Gorkiy Polytechnic Institute: "There Are Many Engineers... But Why Their Contribution to the National Economy is so Small?]

[Text] In order not to have problems with terminology, let us take the "Soviet Encyclopedic Dictionary" (more than one million copies published in 1982). Let us thumb through the pages to the letter "E"... and, to our surprise, we shall not find there the word "engineer". There are "Pedagogue" and "teacher", but there is no "Engineer"! Well, let us take another handbook: "Dictionary of the Russian Language" by S. I. Ozhegov published in 1973. It is also intended for the broad sections of the public. It says clearly on page 229: engineer is "a specialist with higher technical education". Is that all?!

The Resolution of the CPSU Central Committee and the USSR Council of Ministers "On Measures for the Acceleration of Scientific and Technological Progress in the National Economy" states clearly that "the development of science and technology has become one of the main directions in the competition between the socialist and capitalist systems". Russian science and technology are regarded very highly in the world, and their priority in many areas is unquestionable. We know all this very well and are proud of it. But at the same time we are all concerned about the fact that we train more engineers today than any other country, but their contribution does correspond to their number.

Could it be that we are training the wrong people, or not according to today's demands? Or is it that we are using them wastefully, not where they should be used, or wrongly define the place and role of the engineer in production? Or is it that we do not evaluate the engineer's contribution properly?

And if a vuz is given a task to train creative specialists (and this is exactly what the task is), then we should say frankly: the vuz cannot handle this task alone today. The solution is only in a close contact with production (base plants, NII [scientific research institutes] and KB [design bureaus]) through the use of its powerful material resources and active participation in the solution of production problems.

We, for example, have adopted a firm policy of creating educational, scientific and production complexes. Branches of our leading departments have been

established at the base enterprises. Students are trained by leading specialists of plants and NII and KB researchers.

This, among other things, made it possible to assign our graduates one year before their graduation from the vuz. In the department of radio electronics and technical cybernetics, the distribution of the future specialists to jobs starts even earlier, after their third year. The advantages of this are obvious: our future specialists have their industrial training for the courses and diplomas at the same enterprises where they will be working later. Their course and graduation projects, as a rule, are not "standard" or purely educational, but are realistic and connected with the needs of the base enterprise. Therefore, the responsibility factor, as we call it, increases sharply. As a result, more than one half of our graduation projects are recommended for introduction into industry.

Or let us take the economic contracts for conducting scientific studies which are now concluded by the vuz. Their volume in terms of money amounts to millions of rubles a year. However, the work on these contracts is not sufficiently connected with the training of young specialists. Here too, it is possible to connect the educational processes with the solution of specific scientific and technical problems, to have provisions for this in the curriculum, to establish standard legal rules, and to strengthen the financial resources. Life itself prompts us to do that. The best way to interest the student in acquiring a solid knowledge is to make it possible for him to use his knowledge while still in the vuz.

I am convinced that students should be entrusted with serious professional jobs. Let them test themselves, accumulate experience and get used to independent work, risk and imaginativeness. Let me tell you about an experiment conducted by the "Machine Part Department" of our institute which, in my opinion, is interesting. This department created a students' scientific-production team "Designer" which has been working successfully for three years. Of course, even before that we had competent student KB which carried out serious projects by orders from industrial enterprises. We also had SSO [students' construction teams] which worked on the introduction of somebody elses projects. What if we complicate this task and state it in the following way: development of modern technology in SKD [students' design bureau] and their introduction with its own efforts?!

Let me tell you frankly, when the "Designer" started reconstructing the Ozherel'ye Brick Plant in the Moscow Oblast, there were many skeptics. That was two years ago. The first phase of the plant reconstruction which was done according to the "Design" plan and with its efforts is nearing completion.

We believe that young people's integrated creative teams (KTMK) in which our students are actively involved are also very promising. This is also one of the new and interesting forms of the vuz's connection with industry. The KTMK have a different basis and a different backbone. Their basis is young scientists and specialists who have the leading role, but the principle is the same as in the "Designer". Created for "a problem", the scientific-production groups undertake not only to study it, but to work on it until their ideas are realized. The "Komsomolka" has already published a report about our KTMK. The educational effect of their creation (in addition to purely industrial effect) is high. The main advantages of KTMK are their integrated structure and the fact that they

stay with the problem from the time of conceiving an idea for its solution to its realization. However, the rate of the introduction of new equipment still depends sometimes not so much on the importance and originality of the scientists' research as on an extreme situation which develops in industry. Unfortunately, this is the most characteristic detail in our relations with many of our clients (I am referring here not only to KTMK, but to the entire vuz science as a whole). Quite often our studies in the area of new equipment and technology are brought only to a design stage or an experimental specimen, but it takes a long time to reach the stage of series production and wide introduction.

Quite recently a group of our leading scientists was awarded the USSR Council of Ministers Prize for the introduction of new technology in the area of powder metallurgy. This, of course, was a happy event. But there was some bitterness in this victory: this work was started in the institute more than thirty years ago and could have been introduced into industry much sooner. Unfortunately, this did not depend on the scientists alone.

At the vuz, we are constantly telling the students about the difficulties of the introduction of new ideas and the necessity for them to develop a fighting spirit, particularly a strong will, patience, persistence and optimism. However, the client quite often puts off the introduction of research results "for later on". The client does not bear the responsibility for the introduction of research and, moreover, he is seldom interested in this.

I think that the measures implemented for the acceleration of the scientific and technological progress in the national economy will compel to give up the extremely simplified evaluation of the vuz with respect to the training of specialists based on a purely "accounting" approach, the evaluation based on the so-called "concern about the retaining of the student body". The training of engineers must be competitive. I believe that no one will suffer a psychological shock if we officially reinstate the status of candidate-students. I would say that students are corrupted today by the tendency to be dependent on others: somebody must necessarily pull you by the ears to the degree, to the diploma and to the production norm, somebody must necessarily take care of you and be your baby-sitter!

Education is gained through hard work. You are engineers. You bear the responsibility for the scientific and technical progress. It is your duty to bear this responsibility.

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CSO: 1814/81

IMPORTANCE OF RESEARCH, INNOVATIONS IN AZERBAIJAN ECONOMY

Accelerated Introduction Needed

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Editorial in feature "Science and Production": "To the Advanced Lines"]

[Text] Today is a unified political day--Leninist Friday--in the republic. Communists, all workers at plants and oilfields, construction projects, kolkhozes and sovkhozes, scientific institutions, VUZ's and schools will discuss the materials of the AzSSR Communist Party Central Committee plenum held recently, which was devoted to the tasks of the republic's party organizations in implementing the CPSU Central Committee and USSR Council of Ministers decree "On measures to accelerate scientific and technical progress in the national economy." This decree should become the specific program of actions for all party, soviet and economic organs in the republic to further improve the efficiency of production and its intensification.

And today in all labor collectives it is necessary to thoroughly examine the opportunities and ways of making more extensive the integration of science with production and the introduction of the achievements of science, technology, advanced experience, and the proposals and innovations developed by scientists under the conditions of a specific enterprise, ministry and department, kolkhoz and sovkhoz.

The republic's scientists--staff members of the scientific institutes of the AzSSR Academy of Sciences and sectorial and planning NII [scientific research institutes]--have to specify ways to increase the output of scientific research, to bring the basic and applied sciences as close as possible to the real requirements of the economic system and the national economy, and to increase scientists' responsibility for the practical introduction of scientific developments and reduction of the periods of time for it.

As stressed in the decree of the AzSSR Communist Party Central Committee plenum, all the primary party, trade union and Komsomol organizations, people's control organs, scientific and technical societies, innovators and inventors must make their own contribution to the solution of these problems.

Today is Leninist Friday. We must have a serious, businesslike discussion, a self-critical approach to analysis of the reasons for our own unfinished work and omissions, directed at resolving the most important state problem--acceleration of scientific and technical progress in the national economy.

Scientist on Planning, Coordination

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Article by A. Shchegolev, manager of a department group for coordinating operations to introduce scientific developments of the NPO [Scientific and Production Association] for Space Research attached to the AzSSR Academy of Sciences: "An Efficient System for Planning"]

> [Text] At the 26th CPSU Congress and at the November (1982) and June (1983) CPSU Central Committee Plenums, the problems of accelerating the development and introduction into the country's national economy of fundamentally new forms of engineering, materials, and advanced technology were raised sharply before Soviet science as never before.
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> As noted at the recent plenum of the AzSSR Communist Party Central Committee, at which measures to accelerate scientific and technical progress in the national economy were examined, the success of joint work by scientists and production workers depends to a large extent on whether an integral systems [sistemnyy] approach has been provided for the planning and management of science and introduction of its achievements in production.
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> The author of the article we are publishing today reflects on this theme.

In recent years, important work has been carried out in the republic to improve the organization of academic science, the arrangement and structure of scientific institutions, and reinforcement of the link between science and practice. Establishment of the Scientific and Production Association for Space Research attached to the AzSSR Academy of Sciences is an example. This is a development of cooperation of the links in the "search-research-development-introduction" process. The structural formation of the NPO for Space Research provides for implementation of the entire complex of scientific research and experimental design operations through the full cycle of "concept-experiment--technology-engineering." This makes it possible to bring new technology being developed right up to the stage of assimilation in industrial production, and in a number of cases, to its direct output immediately to the national economy.

Introduction is a multifaceted, complex problem. In introducing the achievements of science into production, it is inevitable that definite difficulties, even resistance, have to be overcome. The conservatism of economic executives and their reluctance to introduce what is new often stems from the need to

fulfill plan targets in full volume and in established periods of time and from the lack of reserve capacities at the overwhelming majority of enterprises. The introduction of what is new certainly requires expenditure of efforts, time and resources. For this reason, such a businesslike, daily collaboration between academic institutes and enterprises is necessary, and when they proceed jointly to resolve problems of scientific and technical progress, technical innovation is not "thrust upon" them, but both sides have become interested in its creation and introduction. The entire history of the NPO for Space Research is testimony that such collaboration is possible. It has been developed along two lines: a direct economic contract and a contract on creative socialist collaboration. The activity of the NPO, which is a self-supporting academic organization, is quite substantial. The volume of economic contract operations over the past 8 years has increased by 40 times.

These two forms of collaboration have been well worked out and are being widely utilized by other institutions of the Academy of Sciences as well. But in view of the local nature of such contacts, the work as a rule amounts to the creation of single-unit models of new equipment through the efforts of the scientists themselves and their introduction by a direct customer. In rare cases, machines and equipment which have been developed succeed in reaching series production. In order to ensure the needed volume and determine the number of units for innovations, scientific organizations have to carry this out through their own experimental production facilities. But after all, the basic task of test production facilities, all the same, is to create experimental and test models and to complete work on appropriate technology. In addition, experimental production facilities manufacture the equipment, attachments, fittings and the like which are necessary for scientific research and experimental design operations. For this reason, THE RESERVE IN ACQUIRING AND EXTENDING NEW TECHNOLOGY IS SEEN IN GREATER EMPHASIS ON SECTORS' PRODUCTION BASE. The number of units of the achievements of academic science certainly must be determined with regard to scope, on an industrial basis.

In my view, an efficiently functioning system is necessary which embraces planning and organization, material and technical provisions, and scientific and procedural management of operations to introduce the results of academic research into production.

The plan for introduction of completed scientific research and experimental design operations which is put together by institutes of the Academy of Sciences every year may serve as the basis for it. This would yield good results. We will increase the organizing and mobilizing role of the plan if it becomes A DOCUMENT OBLIGATORY FOR EXECUTION NOT ONLY FOR THE INSTITUTE, BUT FOR THOSE ENTERPRISES, MINISTRIES AND DEPARTMENTS WHERE INTRODUCTION OF THE SCIENTIFIC RESULTS IS BEING CARRIED OUT AS WELL. After all, they now have practically no responsibility for this at all. The plan for introduction remains a unilateral intra-academic document, and in essence it only unites in one document the operations for introduction being carried out by institutes and KB [design bureaus]. It is possible and expedient to divide operations into independent sections, where results are introduced on a republic scale directly for the

needs of the republic's national economy, and separately for operations of all-union importance, after having coordinated them with the appropriate ministries and departments.

The principle of formulating the plan for introduction and the criterion for selecting operations to include in the plan require improvement. Emphasis should be placed on the results of the new and most important scientific research and developments which will yield an appreciable economic gain in brief periods of time. At the same time, the WORK ON INTRODUCTION MAY BE CONSIDERED AS COMPLETE ONLY WHEN THE ECONOMIC GAIN BEING PLANNED IS ACTUALLY CONFIRMED.

Life does not stand still, and I would like to direct attention to the fact that the introduction plan's form itself remains unchanged for an extended period of time. Such stability could attest to its high degree of effectiveness, but practice indicates the opposite. As already noted in the press, introduction of the developments of the institutes of the republic's Academy of Sciences is unsatisfactory.

I think that the plan's form also deserves a review. The current one is not sufficiently detailed, and does not take into account that the results of scientific research and developments may be put into use by two channels: firstly, introduction (assimilation) with aim of achieving a materialized result of the developments in the volume necessary to meet requirements of the national economy; and secondly, direct utilization (application, operation) by the largest possible number of consumers, that is, dissemination of the results of scientific developments in the national economy. For this reason, apparently, it makes sense to divide the plan for introduction not only in accordance with the special-purpose structure but by the types of introduction as well. At the same time, it is necessary to take into account in the division "Introduction into production" all the possible forms of operations: the planning of a new section, shop or enterprise. their construction, preparation of production, the commissioning and checkout of equipment for the new production, and manufacture of the necessary volume of output being assimilated to confirm the extent to which the development's results are being applied under production conditions. In order to correctly determine the responsibility of each executor for carrying out operations, it is advisable to clearly stipulate the participation of scientists in the operations listed above.

In the division "Introduction for Consumers" it is advisable to take into account operations to prepare innovations for use and to achieve planned economic indicators in operation and mass distribution, and to precisely stipulate the form of participation by scientists in these operations. In addition, it is desirable to make a column in which the documents which confirm the completeness of research work would be indicated. This will help to avoid the mechanical transfer of the stages of scientific research or experimental design work to the plan for introduction.

I think it is advisable to include the republic's Academy of Sciences in divisions of the State Plan for Economic and Social Development of the AzSSR not on a level with the republic's sectorial ministries and departments, but to plan the Academy of Sciences' participation in implementation of this plan in accordance with special forms, taking into account the purposes and specifics of academic institutions' work.

The most important stage is putting the plan for introduction into effect, that is, organizing the conduct of operations and verification of their execution. The best results for introduction also depend on the accuracy of procedural rules in the stage of practical implementation of a scientific achievement. The normative and legal basis in effect seriously lags behind the requirements of the day, and it is incomplete and contradictory. The absence in the system of interrelationships of academic institutions and sectorial organizations of norms which regulate different aspects of the process of introducing the results of scientific research and developments has a negative effect both on the effectiveness of the introduction process itself and the efficiency of its administration. In the norms and rules in force, there are no instructions of any kind relating to what is to be understood by the term "introduction of new technology" or by the term "introduction" in general. This leads to a situation in which measures frequently are included in plans for introducing the achievements of science and technology in the national economy which are far removed from them, which in turn entails the use of financial resources which have not been assigned and their overextension, and this impedes introduction of the results of scientists' efforts. For this reason, for academic institutions it is very important to include as much definiteness as possible in the concept of "introduction," which has different shades of meaning, and to reinforce the interpretation of terminology in the corresponding documents of a normative nature at the departmental and republic levels.

Well-grounded planning to implement the achievements of science in production and overcoming contradictions and inaccuracies in the normative and legal basis--it is these links in the chain of administration without which the system cannot be developed at its full value. Organizational measures which are conducive to rapid advancement of the most effective innovations into the national economy are necessary.

Containerization in Construction Underutilized

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Article by Sh. Dadashev, honored construction worker of the AzSSR: "Container Carriers Are Not Being Used in Construction as Assigned"]

> [Text] The low level of mechanization in the delivery of materials to projects under construction was among other shortcomings in construction production which were subjected to sharp criticism at the AzSSR Communist Party Central Committee plenum. It was stressed that the problems of transporting construction materials in containers and packages has not been resolved to date.

> As is well known, the principal shortcomings of the method now in effect for delivering construction freight to a project are the mass utilization of manual labor, the inadequacy of the forms and means of transportation and the damage and breakage of materials, and the above-norm downtimes of transport.

How can we get out of the situation that has been created? How can we avoid the many transshipments of freight, the breakage and damage of valuable materials, and the wide use of manual labor?

The results of scientific research and many years of domestic and foreign experience demonstrate that the most efficient and effective way of mechanizing loading and unloading operations is organization of shipments in containers, on pallets, and in packages. The system of container shipments of bulk freight, which BAKINSKIY RABOCHIY has written about more than once, has been introduced in many sectors of the national economy and has turned out to be extremely efficient. But how are construction workers carrying out this important state task? The answer to this question can be obtained from the experience of the country's construction organizations at different structural levels and in the diversity of their tactics.

The special-purpose program "Komplekt," which provides for the manufacture of a definite number of containers, was developed in the USSR Ministry of Industrial Construction for their own enterprises and upon application from organizations within their jurisdiction. Thus, for example, in the Glavarkhangel'skstroy [Main Administration for Construction in the Arkhangelsk Region] containers have been manufactured by each trust for its own needs. In the Cherepovetskmetallurgstroy Association, more than 6,000 containers and 15,000 pallets were manufactured just for transporting freight of the UPTK [administration for the production and technological preparation of complete units]; as a result, the annual economic gain from the shift to a containerization system amounted to about 1 million rubles. In the Glavleningradstroy and Glavmosstroy [main administrations for construction in the Leningrad and Moscow regions], this is not the first year that containerization has been carried out and it has reached a high level.

In construction organizations which have achieved a good level of container and pallet shipments, manual labor is permitted only for transporting a limited list of materials which do not lend themselves to containerization: facing tile and certain sanitary engineering and electrical engineering items.

But how are matters in our republic? If it is taken into account that, as an example, one-quarter of the workers employed at construction projects last year were utilized in auxiliary and ancillary operations, it is easy to assess the advantage obtained by construction organizations which systematically utilize containerization year after year, thereby releasing workers to shift them to construction and installation work. With an average annual output per worker for the republic of about 10,000 rubles, each 100 transferred workers will provide an increase in the volume of construction and installation operations of 1 million rubles--a grand total of about 150 million rubles.

As a matter of fact, work to shift shipments to advanced technology and organize container operations in construction organizations has already begun. In accordance with plans for introduction of the achievements of science and technology for 1983 by components of the AzSSR Ministry of Industrial Construction and Ministry of Rural Construction, principally the UPTK's of trusts, materials valued at tens of millions of rubles should be delivered to construction projects in containers, on pallets, and in packages.

There are plans, but the point is that not one of the ministries has the means available to deliver even a small part of this amount of freight. Throughout the 10th and 11th Five-Year Plans, the industrial base of many construction trusts was purposefully reinforced, their stock was replenished with new machines and machinery, and the technical level at which basic production was equipped was raised. At the same time, auxiliary and ancillary services lagged in their development and insufficient attention was devoted to them. For this reason, manual labor with low productivity predominates in this area of production. And what is especially unfortunate, that substantive measures are not being taken now either, was particularly stressed at the plenum of the AzSSR Communist Party Central Committee.

Organizations of the Ministry of Industrial Construction have at their disposal only 370 containers of different types, and the Glavkolkhozsovkhozstroy and Glavazmeliovodstroy are taking only the first steps to develop and introduce a containerization system in construction. Their intentions are serious, and perhaps results should be expected in the near future, too.

Unfortunately, however, there are examples of an incorrect approach toward new technology which has already been acquired and failure to use available opportunities. Here is one of them. For the mechanization of loading and unloading operations to transport building stone [kamen'-kubik], the USSR Ministry of Rural Construction sent the AzSSR Ministry of Rural Construction 16 container carrier-automatic unloaders (automatic loaders) with a complete set of container forklifts for delivery of 32-unit batches.

And how are they being used? On seven of the machines sent for the use of Azsel'stroy Trust No 2, the lifting mechanism was reduced to an unworkable condition; more simply stated, it had been pulled apart completely. The same fate overtook two container carriers at the Kishlinskiy Vehicle Depot of the Ministry of Rural Construction.

So the special new equipment, which scientists, engineers and employees had worked to create, was turned into simple trucks because of the reluctance of careless executives to trouble themselves with "unnecessary" worries.

But after all, these container carriers, with a little modification, are capable of delivering even larger batches of stone--64 and 96 units each. In addition, there is lifting equipment on the container carriers, and they are self-contained, operating independently of the cranes at the quarry and the construction project. This is extremely important, since motor vehicles at construction projects stand idle for long periods because the tower cranes are in continuous use.

We cannot but mention also the fact that when new equipment is sent to rural builders, the technology was thought out by taking into account that most of the stone now is selected by construction organizations from quarries by "self-removal" ["samovyvozom"] with the wide use of manual labor (in our republic, 100 million pieces with a total weight of 3 million tons are acquired in this manner).

When stone is delivered by this procedure, with the use of container carriers with container forklifts, manual labor is employed only in stacking the stone on an exposed surface of rock [zaboy]. Other manual operations, including at the construction site, are eliminated. The need for a larger number of loaders no longer arises. An obvious benefit exists for both construction workers and transport workers. With the container carriers, 8,000-10,000 pieces of building stone can be delivered daily to construction projects, or 2.5 to 3 million pieces annually, which is approximately two-thirds of the requirement of the AzSSR Ministry of Rural Construction.

It appears that everything has been taken into account. But after all, the container carriers "have not come" to us, and they are being used, I repeat, not as they were assigned, but as ordinary motor vehicles. I have worked in transport. I know how in certain motor pools they try to get rid of special types of vehicles, worrying more about their rest than about the state's interests. One would think that it is still not too late to correct the situation and to direct the container carriers to the work for which they have been directly assigned.

This is a particular case. It is necessary to examine the problem at first hand and in connection with the increasing volume of capital construction in the republic, with its requirements for labor and material resources.

Everything new is assimilated with difficulty. In the country's construction organizations the shift to an advanced system for freight shipments also has not lasted for a year. For example, container facilities in components of the USSR Ministry of Construction of Heavy Industry Enterprises were created over 5 to 6 years. As already stated, there also exists considerable advanced experience in the step-by-step introduction of container shipments of construction freight. So that there is someone to be taught. We need only to set about the work not simply "to check it off," but in earnest, practically. And then the work will proceed. It will proceed and it will yield a huge gain for the republic's national economy.

More Efficient Textile Looms

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Text] Sheki--Ten new shuttleless looms have been put into textile production at the main enterprise of the Silk Production Association imeni Lenin. They are nearly twice as productive as the old mechanical looms, and more convenient to manage.

"Successful realization of the program to introduce new equipment and technology in the shops of our enterprise," said Yu. Abdurakhmanov, general manager of the association, "has helped to overcome the collective's previous lag and to improve technical and economic indicators. Compared with the corresponding period last year, the association's labor productivity has increased by over 10 percent. On the average, the volume of sales and gross production of silk fabrics, sewing thread and other articles has been increased by 16.5 million rubles."

The silk workers' working conditions also have been improved appreciably, rates have been accelerated, and product quality has been increased after installation of new dyeing and twisting machines in branch No 3 and of a new cocoon dryer at the raw material base.

The technical re-equipment of Azerbaijan's silk industry leader will be still further accelerated next year. The textile industry will obtain the "registration" ["propiska"] of more than 160 jacquard and shuttleless looms, and silk-reeling units, automatic cocoon calibrators and other machines which will make the silk-reelers' work easier will be installed.

Improved Technology in Shoe Factory

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Text] Baku--Four assembly-line workers at the Baku Standard Footwear Factory have had to master the new occupation of operator-technologist. That many persons, instead of the 13 formerly, now attend to the semiautomatic line for the production of slippers which now has been put in operation.

Without being inferior in capacity to its predecessor, the new line ensures significantly higher product quality and is economical to operate. Footwear is stitched on it by a new method: operations included in the production cycle fix the form of the slippers under high temperature with the aid of manipulators. The high precision of the automated processes has eliminated the need for milling the soles.

The line, created by staff members of the Kiev Technological Institute of Light Industry in collaboration with Azerbaijan specialists, is not like any other in use. Now in Kiev, one more similar line intended for the manufacture of street footwear is being created at the request of Baku footwear workers.

Innovations in Machinery Manufacture

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Text] The Baku Experimental Machinery and Repair Plant is continuously bringing up to date the products list of its output. This year it has mastered production of modernized units for the repair of hydraulic engineering installations and spreaders of composite facings [ukladchiki kombinirovannykh oblitsovok].

The collective of boilermakers headed by V. Kul'ba is taking part in production of the spreader of composite facings. This unit is intended for operation on canals. In one pass the spreader lays polyethylene film along the entire perimeter of the canal, covers it with a layer of oscillated concrete, and cuts the longitudinal and lateral seams. The machine also can perform the customary facing from concrete slab.

Oil Rig Automation, Helipad

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Text] Kaspiy, restless more than 300 days per year, now is unable to prevent oil workers on the "Bakhar" offshore oil rig of the NGDU [Oil and Gas Extraction Administration] imeni Serebrovskiy from getting to their shift on time. A helipad has been put into operation, and rotorcraft are bringing the workers to the steel island.

After reconstruction, recovery of the fuel was automated on the rig. Now operators extracting oil and gas will not have to make the rounds of the wells several times a day, checking their operation. Automatic sensing devices will take the necessary variables and transmit them to panels controlling sectors of the oilfield. An electronic computer, by receiving data on recovery conditions and weather changes, will be able to expeditiously determine the best operating conditions for the wells.

Oil Workers, Scientists Collaborate

Baku BAKINSKIY RABOCHIY in Russian 16 Dec 83 p 3

[Letter from A. Dzhafarov, chief engineer of the VPO [All-Union Industrial Association] Kaspmorneftegazprom to the column "After Statements in BAKINSKIY RABOCHIY"]

[Text] On 2 June 1983 BAKINSKIY RABOCHIY published the article "Unite Scientists' Efforts" by M. Abasov, academician-secretary of the Department of Earth Sciences of the AzSSR Academy of Sciences. In it the author cites the results of scientific research conducted by AzSSR Academy of Sciences institutes in the field of predicting oil-and-gas-bearing territory in the republic, searches for new gas and oil deposits, calculation of stocks and planning the development of discovered deposits, and methods of intensifying oil and gas recovery and their practical implementation.

It should be noted that oil rig workers are receiving definite assistance from the scientific research institutes of the republic's Academy of Sciences in implementing the measures cited.

For example, the Institute of Geology of the AzSSR Academy of Sciences, jointly with the VPO Kaspmorneftegazprom and other scientific research institutes, as well as production organizations, has developed a comprehensive special-purpose program to study the geological formation and oil-and-gas-bearing properties of the Caspian Sea.

Calculations and recalculations of the stocks of oil and gas and planning of the development of maritime deposits are being carried out in close contact with the Institute of Deep Petroleum and Gas Deposits Problems of the AzSSR Academy of Sciences.

There is no question that there are many problems in the overall development of maritime oil and gas resources, and they should be resolved through the efforts of the republic's scientific research institutes, VUZ's and planning organizations. At present, nearly 70 percent of the oil and more than 90 percent of the natural gas recovered in the republic comes from maritime depsoits.

However, with the development of fuel recovery, the depth of oil and gas formations is being increased up to 6,000-7,000 meters; in this regard, the construction of hydraulic engineering installations, well-drilling, equipment at the deposits, planning an efficient system to develop deposits, and so forth become more complicated. For this reason, the united efforts of the republic's scientists should be directed at resolving precisely these problem areas in maritime oil and gas extraction.

8936
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NEED TO IMPROVE WORKERS' ECONOMIC TRAINING DISCUSSED

Minsk SOVETSKAYA BELORUSSIYA in Russian 21 Oct 83 p 2

[Article by V. Medvedev, director of the Belorussian Scientific Research Institute for Scientific and Technical Information of the Belorussian SSR Gosplan, professor and doctor of economic sciences: "A Compass in the Sea of Knowledge"]

> [Text] The June 1983 plenum of the Central Committee pointed out with special force the need for improving the workers' economic training in every way possible. Comrade Yu. V. Andropov said during the plenum: "It is necessary to decisively raise all of our ideological, indoctrinational and propaganda work to the level of the largest and complicated tasks which the party is solving during the process of improving developed socialism...a new and significantly higher level of ideological and theoretical work in the area of the social sciences, especially that of the economic sciences, and of the work of our scientific institutions and of each scientist individually must be achieved. A decisive change toward the real and practical tasks, which life is placing before our society, is needed."
>
> An important role in forming the qualities of a harmoniously developed person belongs to economic education.

The conditions, under which the national economy is now developing, require an increase in the consciousness and high qualifications of the workers, accuracy in the work rhythm, its discipline, and a proprietory attitude toward national property. All of this together contributes to the rational use of the enormous production potential that has been created by the people for further raising the level of development of production forces and for increasing the material and cultural well-being of the workers.

The actualization of the content, goals and tasks of economic indoctrination is an urgent problem of today. It is necessary to recognize that the informational potential of economic education is not always being taken into account and used in the required manner at the present time. You see, informational systems

are expanding the sphere of application of innovations and are accelerating the general economic growth. Any scientific discovery, research or development begins with information which provides the conditions for developing more improved technological processes, machines and mechanisms and which contributes to the very rapid incorporation of the latest achievements of science, technology and progressive experience into production. Unfortunately, one still has occasion to encounter underestimations of the importance of information in accelerating scientific and technical progress on the part of individual directors and an underestimation of the role which it has been called upon to play in improving the workers' economic education.

Today, informational resources, which carry scientific and technical knowledge that is obtained during the creative work of scientists, economists, engineers workers, kolkhoz members, and other specialists, are playing a large role in the development of social production along with material, energy, natural, labor, and other types of resources.

Everyone needs information. In contrast to the products of material production, information, once created, can be used repeatedly over the course of an unlimited time by a great number of consumers. Whereas 50 years were required at the beginning of the 20th century for the doubling of the amount of information, the number of only purely scientific publications in the world doubles every six-eight years now. More than 10 million documents are being published throughout the world, and this mass of information possesses the tendency to grow continuously.

Scientific and technical information is one of the most wide-spread and mass forms for the existence and functioning of general knowledge.

Only that scientific or production collective, which effectively uses information about the latest achievements of native and foreign science, technology and progressive experience, can work fruitfully. That is why the requirement to improve the scientific and technical informational system and patent licensing work is contained in the "Basic Directions for the Economic and Social Development of the USSR During 1981-1985 and for the Period Out to 1990".

A large scale-system for the informational support of the national economy's different branches and for the all-union and republic special purpose complex programs and for the programs to resolve the most important scientific and technical problems has been created and is functioning successfully in our republic.

The leading coordination and methodological scientific and technical information center in the republic is the Belorussian Scientific Research Institute for Scientific and Technical Information of the Belorussian SSR Gosplan. It has at its disposal a modern material and technical base, possesses a rich scientific and technical library, and annually increases its reference and informational assets which today exceed 12.7 million of the most varied documents on science, technology and progressive production experience.

Now, under the conditions of the scientific and technical revolution, the main task in the economic sphere is a cardinal improvement in labor productivity. As was pointed out in the June 1983 CPSU Central Committee Plenum, we must strive to achieve the highest level in the world in this respect. The economic education of the workers can and must play a large role in realizing this task. You see, the atmosphere of creativity, when it exists in classes on economic training, will without fail be transferred to the shops, to the sectors and to the laboratory. Many innovations, new forms of socialist competition and daring production undertakings have been born or acquired specific outlines during economic training if the classes have been filled with high, correct and objective information.

I will cite the following example. The experience of the Volga Motor Vehicle Plant in comprehensively solving questions on improving production efficiency and the quality of work has evoked enormous interest among industrial workers. Our institute published an informational express bulletin "The Experience of the Volga Motor Vehicle Plant Is the Basis for Further Improving Production Efficiency" which was distributed to many of the republic's enterprises. Propagandists and other class directors within the economic educational system used it when studying progressive experience.

Subsequently, the seminar "The Distinctive Features in Managing Production and the Quality of Products and Labor in the Volga Motor Vehicle Plant" was conducted in the capital of our republic on the initiative of the Exhibition of the Achievements of the USSR National Economy, the Minsk Gorkom of the Belorussian Communist Party and the Belorussian Scientific Research Institute of Scientific and Technical Information of the Belorussian SSR Gosplan. At the conclusion of this interesting and instructive seminar which was held with the participation of specialists from the plant, representatives from many of the industrial enterprises in Minsk and the republic watched the film "The Volga Motor Vehicle Plant Has the Floor" and became acquainted with the exhibition "Volga Motor Vehicle Plant -- Efficiency and Quality". This carefully prepared and well-conducted economic training brought noticeable results. The collective brigade form for organizing labor, which was born in the Volga Motor Vehicle Plant, which created objective conditions for improving labor productivity and which contributed to the development of a feeling of collectivism and comradely mutual help, has been widely disseminated in the industry and construction of Belorussia.

Among those who have achieved high labor productivity, I will cite, as an example, the brigade of forgers-punchers in the Minsk Motor Vehicle Plant which Yevgeniy Aleksandrovich Shulyak, Hero of Socialist Labor and winner of the Belorussian SSR state prize, heads. The work forms and methods of the Volga Motor Vehicle Plant workers have become the property of each one here thanks to economic training.

Considerable experience in working in the new way has been acquired in the Mogilev Strommashina Plant imeni 50th anniversary of Great October whose collective has been conferred the title of a collective of communist labor for

its high production indicators and successes in the communist indoctrination of the workers; in the Brest Gas Equipment Plant; and in the Vitebsk Monolit Production Association. Incidentally, a comprehensive "Brigada" program has been developed and is successfully being implemented in this association.

Considerable work in improving the effectiveness of scientific research work and in accelerating the incorporation of its results into the national economy is being performed in Belorussia.

The incorporation of the latest scientific and technical achievements and of progressive production experience contributes to an increase in the national wealth and to the rapid growth in socialist accumulation and consumer resources. That is why the survey informational items: "Increasing Effectiveness in Using Fuel and Energy Resources in Machine Building Enterprises","The Experience of Belorussian SSR Light Industry Enterprises in the Thorough Use of Raw Material Resources", "Increasing Effectiveness in Using Fuel and Energy Resources in the Meat and Dairy Industry Enterprises", and "The Work Experience of Industrial Innovators in the City of Minsk", which have been published in our institute, will apparently prove useful for propagandists and students in the economic educational system.

The economic effect from incorporating innovations,which have been adopted from scientific and technical information sources, is growing from year to year in our republic. During the 10th Five-Year Plan 40,000 of them have been incorporated. This has provided the Belorussian national economy with an economic effect of 170.6 million rubles or 76 percent more than during the 9th Five-Year Plan. More than 50,000 of these innovations have been mastered during the first two years of the present five-year plan, and the economic effect of this has reached 221.5 million rubles.

The Gomel Production Association, which is using the wastes of kapron, lavsan and nitron fibres for the manufacture of non-cloth "dornit" material, obtained a savings of 39,000 rubles last year. During the same year, the Baranovichi Production Cotton Association obtained a savings totaling 66,200 rubles when it incorporated into production an original device which was developed by the Minsk Design and Technological Plant of the USSR Ministry of Automotive Industry. There are many of these examples. It is a noteworthy fact that propagandists and students in the economic educational system are participating in the work to incorporate new equipment and technologies and progressive work methods.

It is necessary to point out that scientific and technical informational bodies and the corresponding services of progressive enterprises and associations and of many ministries and departments are providing a great deal of help to the economic educational system. Thus, informational and propaganda centers have been established and are operating in the Minsk Motor Vehicle Plant and the Borisov Motor Vehicle and Tractor Electrical Equipment Plant. They have permitted the informational support of economic training to be brought together in all plant subunits and its quality to be improved by making maximum use of informational materials and by incorporating the latest technical systems for training students in economic educational seminars, courses and schools.

The skillful preparatory and organizational work, which is being conducted by the USSR Ministry of Automotive Industry, is contributing to the high level of the economic training of the branch's personnel. Programs and lesson plans for the new courses: "Improving the Management Mechanism", "The Economic Policy of the CPSU", and "The Development of Socialist Competition and the Instilling of a Communist Attitude Toward Work", are being prepared in a timely fashion for enterprises and organizations and are being distributed. Classes on these subjects are being conducted accordingly here among the leading workers of the enterprises and organizations, among directors and mid-level specialists and among workers.

As is known, a great deal of attention in the economic educational system is being devoted during this five-year period to the study of courses on scientific and technical progress because the main way to qualitatively improve production forces is to shift to intensive development and to combine in fact the advantages of the socialist system with the achievements of the scientific and technical revolution. During the economic educational process, it is necessary to point out persistently that the incorporation of scientific and technical achievements into production will permit its effectiveness to be increased and -- as a rule -- a savings in material, raw material and energy resources to be insured.

It goes without saying that the search for ways to save and efficiently use metals and fuel, energy, minerals, raw materials, and other material resources must continuously be at the center of attention of the economic training of all of our cadres-- just as questions on improving production efficiency and labor productivity. In addition, however, along with concerns about improving labor productivity and the judicious savings of everything -- from a ton of metal to a kilogram of bread, it is necessary to increase attention on social economic problems at all levels of production and social and economic activity. The improvement of planning and management, the decrease of the percentage of manual labor by incorporating full-scale mechanization and automation, and the creation of those conditions which would interest everyone and each one -- enterprise directors, workers, scientists, and designers -- in updating equipment, improving socialist competition, observing the principle of distribution according to work and conscious discipline, introducing the necessary order, and instilling a creative attitude in people toward their entrusted work -- the economic education of the workers has been called upon to instill all of these qualities.

During the training year which has begun, economic education has been called upon to develop a wider study of the training courses that have been recommended during the 11th Five-Year Plan on the problems of scientific and technical progress, economy and thrift, improving the economic mechanism and management, and carrying out the USSR Food and Energy Programs.

New training programs on several urgent economic, planning and management problems have been prepared. During the training process, it is planned to conduct practical classes on studying and incorporating progressive experience and on mastering skills in analyzing economic activity at the work site (in the collective), compiling personal (brigade) plans for increasing labor

productivity, personal accounts of savings, and the working out of socialist obligations.

The June 1983 CPSU Central Committee Plenum made high demands on the further improvement of party education and mass political and economic training so as to achieve new successes in carrying out the large and complicated tasks which the party is solving during the process of improving developed socialism.

8802
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WORK OF LITHUANIAN ACADEMY OF SCIENCES EXAMINED

Vilnius TIESA in Lithuanian 21 Dec 83 p 2

[From the column "Science and its Applications"; article by Algirdas Zukauskas, vice president of the Lithuanian SSR Academy of Sciences: "Innovation and Progress Take the Unbeaten Paths"]

> [Text] Purpose of the coordinating council and its tasks; How to reduce the length of time between the inception of a scientific idea and its practical implementation; The republic's long-range program.

The June plenum of the CPSU Central Committee calls for scientific research results which would have a more significant practical effect and would substantially improve and expand industrial and agricultural production.

The activities of the republic Academy of Sciences are mainly encompassed in long-range basic research. Intensive scientific research generates new inventions of great theoretical and practical value, also yielding results which help to develop new technologies and new equipment.

Many of our institutes saw the formation of large basic research groups whose joint investigations of the most important long-range problems achieved interesting and significant results. First to deserve a mention is the basic research in physical chemistry and electrochemistry which is conducted at the Chemistry and Chemical Technology Institute. New glossy and various other coatings whose technologies were developed there are widely used in automobile and instrument manufacturing industries. Well directed basic research is being developed at the Semiconductor Institute. Here, the electrophysical properties of semiconductors and their assembled units are investigated within strong electrical fields. Scientists of the Mathematics and Cybernetics Institute have made a considerable contribution in the area of the theory of probability and its application to the solution of its field management problems. Significant also is the work of the Physical and Technical Energy Problems Institute involving the investigating of the heat exchange by convection, and of the Physics Institute in solving the problems of atomic and molecular optics and spectroscopy. It should be noted that all of this significant basic research has a wide practical application. For example, these institutes have the largest volume of product development work, and tha annual economic yield from the application

of the Work of the Chemistry and Chemical Technology Institute amounts to 15 million roubles.

The effectiveness of scientific research increases as the scientific resources are integrated and applied to the solution of scientific problems. In a small republic such as ours the significance of scientific reserach depends first of all on the importance of the investigated problems, the coordination of research work among the various laboratories, and the application of resources to the solution of basic problems. In this respect, many of our institutes could benefit from the experience of Chemistry and Chemical Technology, and Semiconductor Physics Institutes. No less important is the coordination of the work of the Academy of Sciences institutes, universities, and other scientific organizations of the republic, and the effective utilization of its total scientific potential.

The Academy of Sciences is responsible for the coordination of all basic natural, technical and social scientific research. This year the overall program of scientific research work coordinated by the Academy of Sciences includes 638 subjects of which the Academy's institutes explore 326, and the universities 312. Some of the subjects are explored jointly by the Academy of Sciences and the universities. The most important coordinators of this work are 29 problem coordinating councils, most of which are attached to the Academy of Sciences institutes.

During the spring session of this year, the republic's natural and social sciences coordination council discussed the problems of coordination encountered in seeking to increase the effectiveness of scientific research and the rate of scientific and technical progress. In the October session, questions related to the coordination of social sciences were discussed. Some problem solving councils such as those dealing with large-scale use of water resources; electrochemistry, molecular biology, hydrobiology and ichtiology; large-scale energy problems; mechanical, historical, sociological research, and other problems--have expanded their work, and are improving the research coordination and the examination of achievements in the appropriate scientific areas as well as that of their objectives and prospects for development. However, not all of the councils are actively involved so far, and not all of them have become real centers for coordination.

Every Academy of Sciences institute and every laboratory should not only effectively conduct intensive research but should also become a competent scientific center in its own field or, say, a center of the republic scientific thinking. Under the present conditions of scientific and technical progress, the relationship between the applied and the basic scientific research is constantly becoming stronger. The Academy of Sciences coordinates only the basic research while the coordination of the applied research is the responsibility of councils established under the State Planning Committee, Agriculture, Health and Education ministries, and the State Building Committee. General management and the coordination of the activities of all councils is handled by the republic's Scientific and Technical Progress Commission. However, the relationship between the basic

and the applied research is still inadequate. The branches of the coordinating councils should relate their work more closely to the activities of the basic research council under the Academy of Sciences. This is of special importance. Only this can help to improve the application of the basic research results.

In recent years CPSU Central Committee approved several important documents dealing with the questions of technical and scientific progress. They place particular emphasis on the role of the USSR and the republic academies of sciences as well as their responsibility in speeding up the progress of science and technology. It therefore seems that our Academy of Sciences should also devote more attention to technical, agricultural and medical sciences.

A wide scale changeover toward integrated scientific programs with specific objectives is taking place in order to shorten as much as possible, the time between the inception of a scientific idea and its practical implementation.

The Academy institutes participate in working on 22 Union and 10 republican programs.They also successfully manage four republic programs in which a number of republic scientific agencies and organizations take part. The preparation of an integrated Lithuanian SSR program for scientific and technical progress for the years 1986 to 2005 was completed, in cooperation with the State Planning Committee. This sets a course for prospects for the republic at the turn of the 21st century. It is comprised of 37 large volumes. More than 300 USSR's most prominent scientists and specialists worked in 23 of these programs, and 147 organizations were involved in the investigation of various problems. All of the Academy of Sciences institutes actively participated in an contributed to this work. Significant work was accomplished by a leading organization, the Academy of Sciences of Econimics Institute.

Extensive resources are involved in the preparation and carrying out of sound, scientific measures concerning the construction, operation readiness and efficient performance of the Ignalina AES. The Institute of Physical and Technical Energy Problems is responsible for the execution of this scientific and technical program. Six other institutes and the appropriate production organizations are also jointly contributing to this program.

Large quantities of cooling water will be needed for the Ignalina AES. As its capacity increases, the lake water temperature will rise considerably, and this will affect the AES efficiency factor. This will also materially change the lake's hydrothermic conditions. It is a serious problem. These questions are thoroughly investigated by the Zoology, Parasitology and Botany Institutes, jointly with the Institute of Physical and Technical Energy Problems.

Unfortunately, in carrying out the integrated scientific and technical programs with specific objectives our institutes still do not always reach the front line positions. For example, our biology-oriented institutes actively participate in the international program "Man and Biosphere,"

investigating important environmental protection problems. It is desirable, however, that the role of this type of institute would be just as clear cut in carrying out the Food Program.

The development of science is unusually rapid and everyday it requires new knowledge from scientists. The effectiveness of scientific research depends considerably on the scientists' training. The republic scientific cadres constantly merit careful attention. Great improvements similar to those in the entire republic are taking place at the Academy of Sciences; about 30 years ago the number of PhD's and candidates in science was barely 150, but presently it exceeds 6,000.

More thought should be given to the selection of scientifically inclined young specialists and to their provision with post-graduate work opportunities. We will not be able to do it without maintaining good relations with the universities. Recently these relations have been improving, but not sufficiently so far. Since the universities prepare an established type of specialists for production, the graduates sent to the institutes or those starting the post-graduate work often have to waste their first year in readjusting their qualifications and acquiring elementary scientific research skills. Thus, it should be worthwhile to improve the training of future scientists while they are still attending the universities. It would be possible to send more students to gain production experience at the scientific research institutes. This year 384 graduate students acquired their production and training experience at the Academy's institutes where 84 students prepared their graduate thesis. This number is relatively insufficient.

The intensity of scientific research depends considerably on the facilities for scientific and experimental work. Much has already been accomplished in this area.

Building complexes for semi-conductor, physics, zoology, parasitology and biochemistry laboratories as well as several experimental facilities have been erected. Scientific research is becoming more automated and electronic computers are more widely used. In many laboratories of the institutes of physics, semiconductor physics, and physical and technical energy problems, the experimental data obtained by electronic signals are automatically fed into small computers or recorded on magnetic discs which are immediately available. All calculations and the analysis of results are performed by the computers. This speeds up the experiments as many as several dozen times.

Significant work is done by the computer technology and scientific research automation services. On the other hand, it is important that every experimental scientist--whether a physicist, chemist or biologist--can work independently with the modern electronic equipment. To formulate a scientific problem matehmatically and to program it for the electronic computer should be a matter of habit not only to the physicists and engineers but to the biologists, economists and sociologists as well.

Centers for the collective use of select equipment are being set up at the Academy of Sciences. They include the center of electronic microscopy and radiological structure research at the Chemistry and Chemical Technology Institute; the molecular biology laboratory at the Biochemistry Institute which is also available to other institutes; laser technology center at the Physics Institute, and others. These centers help to make a better use of select equipment.

Currently living in the world are nine-tenths of all the scientists who ever lived. Magazines of natural and technical sciences publish several million scientific articles every year. Several hundred thousands of new inventions are added every year to the worldwide pool of inventions and patents. To keep a sense of direction in this flood of information is extremely difficult. The scientists are already spending nearly one third of their time locating needed information or searching out and determining what has already been or is being done. The work of our scientists is facilitated considerably by the main library of the Academy of Sciences and the information services of the institutes. The main library with its branches presently employs 145 people and contains nearly 3.5 million publications.

At the institutes there are ten information sections employing 55 people. The search for information is speeded up by a computer terminal with a display and printing facility, which is installed at the Mathematics and Cybernetics Institute. It enables us to get in direct touch with the Moscow and foreign information centers and to receive the needed bibliographical and factual information immediately, within a few minutes.

Still, neither the best scientific research organization nor the most perfect technology does and can replace an idea. A new, original idea comes in an atmosphere of continuous quest, and in open and friendly discussions and debates, where next to the competent scientists, young people also participate.

Thus we have many opportunities to continue making scientific research more effective and to improve the creative atmosphere for scientific teams.

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CSO: 1809/6

OVERVIEW OF CONTRIBUTION OF SCIENTIFIC RESEARCH TO INDUSTRY IN ESTONIA

Tallinn SOVETSKAYA ESTONIYA in Russian 27 Jan 84 p 2

[Proceedings of a meeting recorded by A. Favorskaya, published under rubric "From Theory to Practice--From Public Council of Scientists," No 50]

[Text] Today's issue of the section, "From Theory to Practice," can be considered an anniversary issue. This is the 50th one, and an excuse to sum up some of the achievements in this area, an excuse to look into the future and answer some pressing questions as to how to proceed hereafter.

How well did this newspaper succeed in reaching the goal it dreamed up, that of being instrumental in advancing science to practical applications? What should be done and how in the future so that the useful ideas of scientists are not left sitting about? Where are today's problem areas of scientific and technological progress in this republic requiring priority attention of scientists, economists, administrating and planning bodies, the community and the press?

It is to discuss these questions that the Public Council of Scientists, which works in the editorial office of this paper and under the aegis of which this monthly science page is published, has met today. Let us recall that this "headquarters for science" at the editorial office is represented by most Academy institutes--institutes of cybernetics, economics, thermophysics and electrophysics, experimental biology, chemistry, geology and, starting this year, the Tallin Polytechnic Institute also.

Reporters from this paper also participated in the Council's meeting. They summed up briefly the items published under the above-mentioned rubric in the last 5 years.

And so, first we shall discuss what has been achieved.

A Moment of Analysis

If we are dealing with numbers, we can say that there have been about 70 major articles pertaining to problems of scientific and technological progress that are pressing for this republic.

To discuss the substance, we can say that the authors of many of the articles (scientists, reporters, engineering and technical personnel from industrial plants) always tried to take a look at the root of a problem, analyze the know-how in organizing research and introducing innovations, as well as to suggest reasonable avenues that would advance the cause and increase the responsibility of all links in the "idea--production" chain.

This moment of analysis and a business-like approach determined, in our opinion the impact of a number of articles published on this science page, in response to which the editorial office received just as business-like answers from republic-level and, in some instances, All-Union ministries and agencies. Let us remind the reader here, as an example, the successive statements made on problems of purposeful organization of being economical with energy in this republic, as well as problems of economic attitude toward developing the supplies of phosphorites, correspondence and articles about reserves that have not yet been utilized in the sectorial technological design services. The reader will find information about steps taken in response to published articles in many issues of this column.

This page also discussed such an important matter, new to the republic, as integrated scientific-engineering programs. What is progressing well in this area, what is not doing as well and why? Which sections of, for example, the shale program that is important to the national economy require special attention under the current five-year plan? Thanks to the concerned involvement of the scientists themselves in such a discourse on the science page, it was possible to answer rather completely these issues of the day, to draw, once again, the attention of responsible individuals and agencies to them.

Perhaps the information about innovations published on the science page of the "Bulletin of Completed Projects" [Byulleten' gotovykh razrabotok] was also useful; it deals with instruments, methods, computers and other equipment that could serve industry even now, provided there is interest in them. Let us recall only the range of these innovations proposed in this newspaper (there were about 40 of them): scissors for titanium and ultrasonic milk analyzer, forecasting winter wheat harvest and a questionnaire system of processing economic data, a detector of concrete strength and method of processing waste from petroleum....

The science page also "peeked" regularly at its neighbors, the scientists of Latvia, as well as, incidentally, into the laboratories of Moscow, Leningrad, Novosibirsk, the Ukraine and Kazakhstan. This was done deliberately: there are many interesting innovations and instructive knowhow in many places, and it would have been simply unwise to overlook them and not to inform our scientists and practical workers about them.

Incidentally, perhaps the readers may have also noticed rubrics on the science page, which have appeared from time to time, such as "Order, Consult and Buy!" "Let Us Make a Note of This," "Assignment for Tomorrow" and "NTR [Scientific and Technological Revolution] in the Shop." Indeed, much of what has been written about has already traveled from laboratories to plant shops, both automated control systems and machine tools, digital control programs and powder metallurgy. And our further progress will also depend on how all of us will know how and be prepared to consult science, take it into consideration and be guided by its carefully weighed words.

... However, the scientists have begun to talk. Let us Listen.

Barriers at the Border. Where Do We Actually Want to Go? Patents or Licenses?

"The course taken is welcomed in every way: first there must be help to remove the barriers between science and practice. The most burning problems are presently there, on the borderlines," says OLAV KEERBERG, candidate of biological sciences, sector chief at the Institute of Experimental Biology, Estonian Academy of Sciences (the scientific search for biological reserves in this republic's agriculture was discussed in several issues of this newspaper with his help). "To stimulate the interest of practical workers in a project from its very start is one of the most important steps in my opinion. Where there is no solid system of communication between a scientific research institute and industry, it is particularly important to have temporary scientific and engineering groups where representatives of both sides are equally interested in the results. This form of collaboration, as you well know, is also mentioned in the decree of the CPSU Central Committee and USSR Council of Ministers pertaining to acceleration of scientific and technological progress. Temporary groups constitute the most promising way for quick developments, particularly intersectorial ones. In essence, the agreements between our institute and the sovkhozes imeni V. I. Lenin and Pirita constitute such a form of collaboration."

"Right now we are developing a problem that is very important to the farms, that of combined control of hothouse microclimate. It has to be combined because the temperature, carbon dioxide, etc., requirements are often contradictory and the optimum must be found."

"And there is another thought that is suggested in this regard: in recent times diverse laser-type radiation, magnetized water and many other items along the same lines have been proposed with increasing frequency to agriculture to improve effectiveness. But, let us mention, that there is still no adequate scientific validation of such innovations. PRAVDA also once wrote that a system of state expertise and testing must be established to determine where and under what conditions such factors could yield the desired effect. Let us take, for example, exposure of seeds to lasers: What is the physical or other essence of the effect? I suggest that this be noted for discussion when we talk about agriculture."

ANTS VYRK, candidate of engineering sciences and deputy director of the Institute of Cybernetics, Estonian Academy of Sciences (thanks to his initiative, such

of the progressive krowhow of that institute was shared with the column on "From Theory to Practice") made the following statement:

"You know, temporary groups do not overcome entirely the rift between science and practice, which sometimes occurs. We have such groups also, and thanks to them many of the developments of our SKB [special design office], for example, are "grabbed" from us by users. But there are even more very good developments that are ready at the same SKB, which require a plant for their production on a large scale. But, as we know, it means additional worries for a plant to start up production of a new item. It requires complete specifications for the new product, and without them will not even talk to us. And who is to develop the technical documentation? This area of work is totally wanting at the present time, and there is no system whatsoever to provide for such an area. This is how the 'untouchable stock' of valuable projects is formed that no one takes. Yes, yes, just ask Kal'yu Lepik, director of the SKB, he has an entire list of them. We just do not have the leverage to tempt a plant to produce them. It is more advantageous for a plant to do what it was doing 10 years ago."

A. Vyrk shares with yet another concern:

"In general, I should like to have a clearer idea of the future scientific and technological image of our republic. In what direction do we want to move? Is it only as before, to recover shale, phosphorites, make excavators, etc., or should we move to more sophisticated production, from the scientific point of view? We do have the highly qualified personnel for this. Of course, all these are large and difficult questions; the way specialists are trained has to be changed, the balance of manpower must be given some thought. We have a combined program for scientific and technological progress in this republic, in which all of these questions must be worked on, but for the time being the community is very little informed about the results. What is the future course outlined in the program?"

"Personally, I would also be interested in finding out something else: Why did the experiment with Delta not take place? What precisely went wrong? After all, the idea was theoretically useful, that of turning to more sophisticated production, as required by scientific and technological progress. It is useful to analyze sometimes negative experience, rather than only positive."

"Just a few more words. About patents. We like to report that some invention of ours has been patented abroad. Of course, this is a recognition of its worldwide relevance, and this is pleasant. But let us not forget that, for the time being, it is merely an expense for the priority: we have to pay for each patent. This means that there will be no economic gain until the license is sold. According to my information, there are just a small number of licenses at our academy as yet. What in general is being done here in the licensing area? It would be interesting to find out. This newspaper could provide a column on this subject."

Who Stands to Gain From Obsolete Products? An Order for a Specialist is Something Important. No Leaps Made. Do Not Be Afraid of Pointed Questions. Today, Wherever There is Economics There is also Ecology....

"Much of what I intended to discuss here has already been said. In other words, I want to stress the fact that we all have the same problems," stated YURI TANNER, candidate of engineering sciences, chief of the scientific research sector and representative from the Tallin Polytechnic Institute, as he joined in the conversation. "There are also good developments at the TPI [Tallin Polytechnic Institute], as well as concrete customers, but introduction of innovations is a difficult matter. It took 11 years to introduce the famous Portland cement! Why? Because there is no leverage to compel the people in industry to strive to use the proposals of scientists faster. So that I support Vyrk fully; this issue must be resolved as a national one. Why, indeed, is it that some plants produce an obsolete version of some vitally needed item, why not replace it with a new version that already exists? The newspaper could analyze this using concrete examples."

"Do you know what else is urgent in my opinion? To investigate how an order for specialists is formed here. And to what extent do the republic's VUZ's respond to such orders?"

"We already have, for example, basic departments that are working well. The Wood-Working Department of the TPI was established right at the Standard Production Association and with the immediate involvement of the sectorial ministry. It is obvious to everyone that such conditions guarantee specialist training on a par with the most modern requirements of industry. And today another of our base departments is taking its first steps at the Institute of Cybernetics. What does this mean for students? It offers them special lectures, more intensive practice on computers, automation and telemechanisms at a modern scientific research institute, i.e., on a par with the requirements not only of the present, but the future."

"Licensing, which Vyrk discussed, is definitely a very important matter. The TPI has already had some experience with it: the institute has sold four licenses for its inventions, two of them to Japan, one to France and another to Bulgaria. I must say there are few VUZ's in the nation thus far that have achieved this."

"It was said here that we have enough highly qualified personnel for modern and complex industry. I would not agree that these cadres are 100 percent good. Unfortuantely, workers are often unqualified," stated OLEV LUGUS, candidate of economic sciences, chief of the Industrial Economics Sector at the Institute of Economics, Estonian Academy of Sciences; he continued, developing his idea: "There is a rift between the high requirements of modern engineering and the qualifications and training of people. Experience confirms the fact that we are not prepared in all instances for a qualitative leap in industry, yet scientific and technological progress demands it. There must be drastic increase in worker training in secondary vocational-technical schools, and that is the principal route!"

"I am very much in agreement," O. Lugus continued, "with the idea of an integrated program of scientific and technological progress. This year, preparations

have started on working out its second phase, up to the year 2010. It is very important for this program to include more expressly scientific-technical programs and that it necessarily deal with the problem of personnel. As far as I know, this had been done insufficiently in the past."

"One should write more often about all this: what flaws our economy has at the present time, how they will be eliminated in this republic, what direction it should follow in the future. Very much attention has been devoted at the most recent Party plenums expressly to solving obstructive problems. As we know, five large-scale experiments have been undertaken in the nation. In addition, we have our own in this republic, for example Agroprom [agricultural industry]. How are they progressing? How is a result being stimulated? How do we introduce these new ideas? This is of interest to everyone."

"It is also imperative to write about fulfillment of the decree, which has already been mentioned here and which includes steps for acceleration of scientific and technical progress. Things must be written regularly and concretely; information has to be given about progress in introducing new equipment and technology in industry. Questions must be asked of those who are trying to keep their distance from this matter and try to work the old way."

"I agree that our republic-level machine building industry does not have its own modern image at the present time. This also applies to agricultural machine building. We speak a lot, but no leap in quality has been made and the achievements are on the level of prior years. Economists must investigate the scientific-technical level, not only of our machine-building products, but production itself."

"The final result of research was discussed here with anxiety. When work is done jointly by scientific and practical workers there is always a result. That is how the integrated programs were conceived. The newspaper is right in writing about them. In this respect, I think there is a rather large return for the science page."

KHANON BARABANER, candidate of economic sciences, senior scientific associate at the Institute of Thermophysics and Electrophysics, is of the same opinion:

"There is no need to prove that the science page does a needed job. But we must think about how to improve its efficacy," he addresses those present. "We are active in spreading the word about innovations, but what can be done to organize their introduction? This is where a newspaper has much greater opportunities than we usually believe. For example, it is expressly with the newspaper's help that we brought to its logical conclusion the idea of a republic-level integrated "Energy Conservation Program." The program was developed, it exists. At present, it is one of the most comprehensive of similar programs in the nation. Without exaggeration, I can say that the newspaper was its 'godmother.'"

"At the same time, I think that we still fear pointed questions. The most difficult ones emerge on the borderline between sectors. These intersectorial problems demand that we name the mechanism that would get the show on the road."

"For example, how are these problems being solved within the limits of the Food Program? It would be good to see how well geneticists, agronomists, biologists, chemists, power engineers and livestock breeders are collaborating there. In essence, science and practice are still very much apart."

"How does this republic's science participate in the energy program? The different measures in the program are presently being financed separately by the Academy of Sciences and ministries. It would probably be better to use cooperation. Perhaps, following the example of GDR, we should have scientific consultation centers? We are compelled to raise the question of forms that we consider effective. In general, we must think about the burning issues that animate life is constantly advancing."

"Let us take, for example, the concern about the environment. For many it is still simply the next campaign. Yet in fact it is high time to turn to universal ecological-social-economic thinking. A very good example has already been cited here, about the effect of laser beams on harvest without consideration of potential consequences. At present, most problems can no longer be solved only from the economic point of view, will there or not be more profit? Here we are dealing with social and other aspects. Our science page must raise such key issues."

"Such an interesting detail," remarks Kh. Baraner to O. Keerberg. "I see that you are also doing research on the microclimate of premises, but only as it applies to vital functions of plants, whereas we are doing it from the standpoint of energy. I have heard about it here for the first time. That's how far apart we still are! Such studies could also be joined on our page...."

The meeting is over. The ideas, debates and suggestions are formed into a plan, which will be the basis for future work of the Public Council of Scientists and the science page of our newspaper.

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CSO: 1814/78

UPDATE ON RESEARCH IN ESTONIA TO BENEFIT LIGHT INDUSTRY

Tallinn SOVETSKAYA ESTONIYA in Russian 22 Dec 83 p 2

Improvement of Plant Management

[Interview by Ye. Randmaa of Yulo Erikhovich Pyarnits, candidate of economic sciences, director of Planning and Design Office for Control Systems, Estonian Ministry of Light Industry, under rubric "From Theory to Practice--From Public Council of Scientists," No 49]

[Text] Since the early 1970's, the light industry of our republic has been developing by means of intensive factors of management. Radical remodeling of enterprises, use of progressive equipment and technology have had a positive effect on growth of labor productivity. As a result, there has been an increase in output of consumer goods, primarily textiles, clothing and shoes.

Scientific support of industry has acquired special relevance. Major technical and engineering problems are being solved by enterprises in close collaboration with pertinent All-Union scientific research institutes and the Mistra Scientific-Production Association for Nonwoven Fabrics in Tallin.

However, it is not only technology that is responsible for success in this area at the present time. IT IS EQUALLY IMPORTANT TO HAVE COMPETENT MANAGEMENT OF MODERN INDUSTRIAL PRODUCTION, TO IMPROVE THE ECONOMIC MECHANISM AND MAKE EFFICIENT USE OF MANPOWER RESOURCES.

The Planning and Design Office for Control Systems, which is under this republic's ministry of light industry and one of the first of its kind in the nation, is working on these problems. This correspondent met with its director, Yu. E. Pyarnits, candidate of economic sciences.

[Question] Yulo Erikhovich, we had our first conversation 4 years ago. At that time you were chief of a newly established office, about the future of which only guesses could be made. Now that some time has elapsed, tell me which your office has to deal with primarily, science or practice?

[Answer] It would be more correct to view us as the connecting link, a competent intermediary between basic research and industry, since we fill orders of enterprises and associations, and we work on the basis of direct agreements with

them. First of all, we are expected to define problems, detect difficulties that arise on the way toward intensification of production, and then only find effective means of solving them on the basis of utilizing the achievements of modern science, progressive knowhow of domestic and foreign practices.

For example, it is obvious that an administrator needs, first of all, current, exhaustive and, mainly, reliable information about results of work already done; he must receive it in an integrated form, with consideration of relationship between several scattered indicators, rather than in the form of these indicators, as was the case until recently, in order to make effective and economically competent decisions. The matrix method of economic analysis proposed by Prof U. Meriste, which we have adopted in the Statistics Department at Tallin Polytechnical Institute, involves expressly such a systems analysis approach. Our economists have added software to it and adopted it everywhere, with the use of computers. Now the method has become a tool for analyzing all economic activities of light industry and it is being adopted in other republics.

There is also an example from another area. When our psychologists became familiar with the work style of administrators, particularly foremen, they found that many of these people lack the necessary ability to deal with others and this often leads to conflicts, as well as an adverse effect on stability of personnel. To remedy this, we started to use so-called psychotraining, which was developed by Kh. Mikkin, candidate of psychological sciences at the Tallin Pedagogic Institute; it involves video feedback in the course of professional training of foremen; it permits students to view their behavior on a television screen and, with the help of the same psychologist, learn to correct it. We consider this to be a rather promising avenue and intend to pursue it in the future.

[Question] What about creative development work in your office proper?

[Answer] It deals with more specific economic and social problems of enterprises and associations. For example, there is a method of automated estimation in preparing annual economic and technical plans, which takes into consideration the entire product mix listed in kind and cost; it was developed by our specialists and has recently been adopted. We were the first in the country to furnish such information via computers to the Union ministry and Chief Computer Center of the nation. We also turned out to be pioneers in development of the program for keeping an automated record of computer resources, which is now used by computer centers of the light industry in all Union republics.

Our employees also try to get as close as possible to enterprises to solve personnel and organizational problems, including such a pressing one as the brigade form of organizing labor, the need to develop which was indicated in a recent decree of the CPSU Central Committee, USSR Council of Ministers and AUCCTU. Preparations for organizing work brigades are being made on the basis of comprehensive analysis at the work places: optimum work output standards, criteria for additions to index of labor participation, payment for basic and ancillary operations. This scientific approach to the change to organization of work in brigades has already resulted in a 5-7 percent increase in labor productivity of brigade workers at our base enterprises--the Pyarnu Flax Combine and the Baltic Association. Our aim is to achieve the same in the entire system.

Of course, there are still many unsolved problems. For example, although personnel turnover in the sector as a whole is diminishing consistently and stability of worker collectives has improved appreciably, we have not been able to prevent a drop in overall number of workers, and this is a serious problem for us. It is also justified to expect a large return from us as a result of introducing the system for quality control, since there are still many penalties imposed for poor product quality at some enterprises in our sector....

[Question] How is the efficiency of your office's performance actually measured?

[Answer] This is not an easy question, like any attempt to assess a concrete scientific contribution. The fact of the matter is that there are no conventional methods of evaluating efficiency for all of our developments by far. And while, let us say, the economic gain from the same system of quality control constituted over 260,000 rubles last year, which is 4 times more than the expenses to introduce it, how can one determine the return from upgrading the qualifications of an administrator, which will definitely affect his achievements in the future? Or, how can one evaluate the effect of improving the health of the people as a result of our introduction of the Health Program, etc. No one questions the desirability of what has been achieved in this area. But it may be difficult to perceive the benefit of such work in rubles in some cases.

[Question] What is the scientific potential of the Planning and Design Office for Control Systems at the present time? We recall that, when it was founded, it consisted of three candidates of sciences.

[Answer] At the present time, their number has increased by almost five times. In the last year alone, four more of our employees have earned the degree of candidate of sciences without taking leave from their main job, and there is a doctoral dissertation ready to be defended. Every scientific degree that is bestowed means that a staff member's qualifications have been upgraded, as well as his competence and skill in some area, which means improvement of quality of work in the office itself.

[Question] Which of the recently defended dissertations have direct applications to light industry?

[Answer] I would mention the dissertation of Kh. Aasmyae, candidate of geographic sciences, dealing with establishment of socioeconomic and territorial complexes, involving location of light industry enterprises and furnishing them with manpower resources. It was used to prepare a plan for development of the sector up to the year 2005. The work of T. Myar'ya, candidate of psychological sciences, deals with sociopsychological problems of industrial management by a board, which she performed in collaboration with an enterprise. The work of Yu. Yulesoo, candidate of economic sciences, also appears to be quite promising; it pertains to establishment for the first time of a system of forecasting economic planning in the sector that permits detection of trends in development of the sector and projecting them to the future with the appropriate correction using economic and mathematical methods.

Other theses are also being prepared that are related to development of light industry. We hope that this research work, in turn, is bringing us closer to pressing current problems and is instrumental in strenghtening the link with industry.

Powder Metallurgy for Nozzles

[Article by N. Bondar', under rubric "From Theory to Practice--From Public Council of Scientists," No 49]

[Text] Power metallurgy is being used well at the Il'marine Plant. The idea to use it appeared long ago, when it was necessary to improve wear resistance of spray nozzles for fuel gas burners at different TETs's and in boiler rooms. Specialists in the Department of Technology of Metals at the Tallin Polytechnic Institute helped production workers in solving this problem.

Here we have the laboratory of powder metallurgy at the Tallin Polytechnic Institute. Our story about how parts are made out of powder begins here.

Yu. Pirso, laboratory chief, tells us, "The first parts made of power for the Il'marine Plant did indeed first see the light of day here. But it would be unfair not to mention those who initiated this major job. Docent R. Mosberg, who headed at the time the Department of Technology of Metals, was the instigator of opening this laboratory and, so to speak, the "father" of powder metallurgy in this republic. At present, L. Valdma is the scientific supervisor of the laboratory....

My interloculator shows me a small stand with samples of nozzles and sprayers that were designed in the laboratory. The fact of the matter is that it is inexpedient to process the sprayers on metal-cutting machines, as was previously done at the Il'marine Plant. A part the size of a screw is all that remains from a large piece of stock, and the rest becomes shavings. But the main thing is that such sprayers wear out very rapidly, which results in repairs and off time. Would it not be possible to extend the service life of these parts by means of powder metallurgy? Plant engineers turned to the institute for such help. This technology had been in the process of paving its way in the shop and, of course, the scientists had the most significant information about it.

"We have developed sprayers for liquid fuel," continued Yu. Pirso. "Last year the plant adopted them in production and this year is manufacturing them in series."

However, it is better to see something once than hear about it a hundred times. So here I am in the plant shop, more precisely in its new powder metallurgy section. What does its equipment look like? Imagine a special device made of plexiglas, which vaguely resembles a chest. It contains miniature mills that mix the powder. Of what does it consist? The constituents are inexpensive alloys with added rubber plasticizer, thanks to which hard extrusion is obtained.

The powder is precisely batched for each part on a laboratory balance. Then the prepared mixture is poured into a mold. This press-mold was developed through

the joint efforts of scientists, engineers and workers; the institute laboratory prepared the blueprints and designed it, the plant executed it in metal.

... The mold is placed in a hydraulic press. Then 40 tons bear down on the stock. We are asked to see what happened. The stock is taken out. It now shows no difference from a metal bar, but if you were to press on it, it would disintegrate. The part still has to go in the furnaces. First, the plasticizer, which is no longer needed, is removed at a temperature of 700°. Then the part is baked under vacuum at 1400°. Finally, it is submitted to diamond grinding. The sprayer is ready.

"What has industry gained from the new technology?" I asked G. Lutrinu, deputy chief technologist at Il'marine.

"The strength of the sprayers has increased by 10-12 times. This has been confirmed by tests at TETs's and GRES's [state regional electric power plants], under very rigid conditions at that. The fuel oil passing through the sprayer contains mineral particles. Expressly they were responsible for previous wear of operating surfaces of the parts in only a month. But now, when they are made of a hard alloy, they last for a year."

The VUZ specialists and plant practical workers have performed a major and needed job. As a result there has been a saving of materials, less time is spent on replacing worn sprayers at TETs's and GRES's. The plan now puts out thousands of these items per year (this also applies to spare parts). The need for sprayers is growing. Next year, many large GRES's and TETs's operating on liquid fuel will have to be supplied with them.

But there are also problems at the plant with production of these parts. One of the most serious ones is that there is a shortage of nonstandard equipment. Equipment and press molds are needed, powder metallurgy has a great future; it is not only for sprayers that it can be used. This is the opinion both at the plant and in the laboratory.

The sectorial powder metallurgy research laboratory (which is its official name) solves pressing problems of power machinery building. Analysis has already been made of the product mix, and technological validations have been provided for changing to the manufacture of power machinery parts by the powder metallurgy method. Such enterprises as Atommash , Nevskiy Plant, Production Association imeni V. I. Lenin, Saratov Power Machinery Building Plant and others are also interested in this method. It has been determined which parts should be expressly changed to "powder," and what a plant gains from it. The Il'marine and Pioneer plants will have to fill their orders. According to the estimates of specialists, the economic gain from using powder metallurgy in the national economy for sprayers only is 350,000 rubles.

There is still much work to be done on the problem of replacing old technological processes with new, economical ones.

Photo caption: Sintering worker Enn Khinno in shop near hydrogen oven.
Photo by F. Klyuchik.

Improved Phosphorite Mining

[Article by A. Kozhevnikov, Chief of Soyuzgorkhimprom (All-Union Mining and Chemical Industry Association), under rubric "From Theory to Practice--From Public Council of Scientists," No 49]

[Text] The editorial office received one more response to the article by R. Pyazok, candidate of engineering sciences, published here on 8 July of this year, who mentioned several urgent problems related to fullness, comprehensiveness and ecological safety of mining for phosphorites in Estonia.

At the request of the Ministry for Production of Mineral Fertilizers, Soyuzgorkhimprom responded as follows:

"The questions raised in the article are timely and must be solved. At the request of the USSR Council of Ministers, this ministry together with the USSR Ministry of Geology, USSR Ministry of the Coal Industry, State Commission for Stockpiling Useful Minerals and Estonian Council of Ministers elaborated a plan of measures regarding development of new phosphorite mines and oil shale in Estonia.

At the present time, an experimental-production inspection is in progress at the quarries of the Estonfosforit Production Association of the new technology of open pit mining at the Maardu site, which was developed by the State Scientific Research Institute of Chemical Raw Materials Obtained by Mining (GIGKhS) and the production association, which provides for burying dictyonemic shale that precludes its spontaneous combustion. Mining work using this technology is being pursued in accordance with the "Technological Regulations," which have been approved in accordance with standard procedures. Since the new mining system requires strict adherence to technological discipline, Soyuzgorkhimprom has required that the Estonfosforit Production Association and GIGKhS effect more intensive supervision at the quarrie, to prevent spontaneous combustion of dictyonemic shale. In addition, at the request of the USSR Ministry of Fertilizers, the Institute of Radiation Hygiene under the RSFSR Ministry of Health was asked to participate in observations of the condition of the environment during development of the Maardu site. If the tests of the new technology yield positive results, it will be used for open-pit work at the Toolse mine.

At the same time, it is necessary to note that accelerated development and broad practical introduction of the technology for processing dictyonemic shale would be the most radical solution that would preclude spontaneous combustion and also provide for complete and combined utilization of phosphorite stockpiles in Estonian mines. In the opinion of Soyuzgorkhimprom, the institutes of the Estonian Academy of Sciences stopped prematurely their studies of this extremely important problem.

The above-mentioned plan also provides for development of the following by the Ministry of Fertilizers and Ministry of the Coal Industry:

In 1984, the TEO [technical and economic substantiation] of temporary requirements for detailed exploration of the Kabal site, having examined the necessity for building exploration mines with a test section for underground phosphorite mining.

In the first semester of 1987, TEO of permanent requirements for confirmation of mine stocks in Kabal.

In 1988, a chart of development of production of fuel shale and phosphorites on the basis of the supply in Kabal.

In 1989-1990, a plan for the construction of an enterprise on the basis of the stock of fuel shale and phosphorites at the Kabal mine.

There are plans to start construction of an enterprise for processing fuel shale in 1991 and another for processing phosphorites in 1993.

Soyuzgorkhimprom believes that implementation of the above-listed measures will make it possible to develop in an economic way the unique phosphorite resources of Estonia and to make a serious contribution to fulfillment of the tasks of the USSR Food Program.

Sodalites Granted British Patent

[Article by Kh. Kattay, under rubric "From Theory to Practice--From Public Council of Scientists," No 49]

[Text] A pleasant report was received by the Institute of Physics, Estonian Academy of Sciences. The Patent Office of Great Britain has decided to issue patent for an invention made as the result of long-term joint work by the staff of this institute and the State Optical Institute in Leningrad. The invention is called "Sodalite photo- and/or cathode-chrome material, method of production and its use in equipment with variable light transmission."

Sodalites are substances that are strongly colored when exposed to hard radiation. This property is used, in particular, for so-called shadow recording of information using an electron beam (stable dark trace on white background of sodalite screen of a cathode-ray tube). The team of inventors were the first to succeed in developing the technology for manufacture of transparent sodalite parts that have significant advantages, for example, in large-screen light projection of electronic tracings, reconstruction of synthesized holograms, as well as other applications in informatics, optics and optical electronics.

The authors of this invention are Viktor Denks (initiator of the project), Roman Denisov and Aleksandr Dudel'zak (who is presently working at the Institute of Thermophysics and Electrophysics, Estonian Academy of Sciences), all of whom are candidates of physicomathematical sciences from the Institute of Physics, Estonian Academy of Sciences, and from the State Optical Institute the participants are Engel's Ryzhikov, candidate of engineering sciences, Vladimir

Demidenko, Filipp Volynets, doctor of engineering sciences, and Yevgeniya Terent'yeva.

This is the first foreign patent, the co-authors of which are on the staff of the Institute of Physics in Tartu.

10,657
CSO: 1814/78

PATENTS, LICENSING, AUTHOR'S CERTIFICATES IN ESTONIA DISCUSSED

Tallinn RAHVA HÄÄL in Estonian 18 Nov 83 p 2

[Article by Jüri Käosaar, constructor in the Tartu branch of the special construction bureau, ESSR Academy of Sciences: "200 Author's Certificates and Separate Licensing Agreements A Year: Is This Much or Little for the ESSR?" Passages in boldface rendered in all caps.]

[Text] Recently the second all-Union scientific-practical conference on "Development of the scientific-technical creativity of personnel" was held in Tashkent. The importance of creativity by all workers of our country for solving any and all problems faced by the state was stressed. Great att n-tion was paid to the creativity of the young and its development, and to teaching methods of creative inquiry. It is of the latter aspect that I would like to say more, t·ing it to the question posed in the title.

UNIVERSALLY NOVEL IDEAS ARE THE BASIS FOR AUTHOR'S CERTIFICATES. The idea itself is in turn a possible solution of the problem. 60-200 ideas are required to create a suceessful product, of which 2-3 remain in the finished product. These are the ones that must be raised to the level of author's certificate and in better cases will reach the world market.

There are METHODS OF CREATIVE INQUIRY TO ARRIVE AT THE NECESSARY IDEAS.

History shows that many famous inventors had their own favorite procedures and methods to solve problems of invention. Methods of creative inquiry have already helped to solve problems of invention. Methods of creative inquiry have already helped to solve many invention and construction tasks, and for this reason it is useful to classify these methods and teach them to inventors and constructors.

Although the majority of today's inventions is made collectively, the collective's potential depends greatly on the training of its members. Moreover, research done in the United States indicates that 60-80 percent of recent important inventionsswere still made by single (or two) inventors. The age of the individual inventor has thus not passed and the application of their inventive capacity depends greatly on training.

THE THEORY OF INVENTION HAS DEVELOPED RELATIVELY RAPIDLY, BUT THERE IS INSUFFICIENT AWARENESS OF THIS AMONG INVENTORS AND CONSTRUCTORS and they are not capable to comprehend that discipline without instruction.

METHODS OF CREATIVE INQUIRY ARE TAUGHT IN MANY SOVIET CITIES AND UNIVERSITIES. "Principles of technical creativity" has been a required subject since 1980 in all the technical colleges of the Ukrainian SSR. Our neighbors in Leningrad and at the Riga Institute for Improving Qualifications of Leading Cadres and Specialists have taught it for almost ten years.

So--there is instruction almost everywhere in the USSR, except in Estonia. And the results are at hand.

The number of scientific personnel and engineers in our republic is quite respectable. APPROXIMATELY 6000 SCIENTISTS AND 12,000 ENGINEERS are employed in ESSR research institutes and construction and technology organizations, with additional scholars in the colleges. If half of them would do creative work at the level of author's certificate, then a MODES CALCULATION WOULD RESULT IN ALMOST 1000 INVENTIONS PER YEAR. But currently there are only 200-250 author's certificates. AS A COMPARISON IT MIGHT BE NOTED THAT EVERY MAJOR USSR COLLEGE AND INSTITUTE PRODUCES AS MANY OF THEM AS OUR ENTIRE REPUBLIC.

OUR REPUBLIC TRAINS QUITE A FEW PATENT SPECIALISTS. Almost 50 specialists a year receive their second college dipolma in the field of patent study, the same number graduate from the social patent institute.

There are thus enough people in Estonia who could generate new ideas, as well as patent researchers and specialists with education in the patent field. But the number of annual author's certificates does not increase. What is the matter? Apparently MORE IDEAS ARE NEEDED that could serve as a basis for future author's certificates.

Artists are taught in the art institute, musicians in the conservatory, the technical basics of construction in technical schools, ecc. TRAINING OF INVENTORS HAS BEEN LEFT TO CHANCE IN OUR REPUBLIC--let him whom nature has endowed with that talent invent. Scholars maintain, however, that better idea generation can be taught and learned. THE INVENTING ABILITY OF PERSONNEL WHO HAVE ATTENDED APPROPRIATE COURSES DOUBLES, both in generating technical ideas and solving management problems, etc. Engineers who previously showed no interest in inventing began to solve technical tasks at at author's certificate level after attending the special courses. The inventors of our republic are like athletes without a trainer and correct training methods.

THE MECHANISM FOR CREATIVE ACTIVITY LIES IN THE UNITY OF INTUITIVE AND LOGICAL THINKING. WHEN HUMAN EXPERIENCE HAS GATHERED FINISHED LOGICAL PROGRAMS, TASK SOLVING WILL OCCUR AT THE LEVEL OF LOGICAL, I.E. STANDARDIZED SOLUTION PROCESS. WHEN THE SUBJECTIVE LOGIC AND OBJECTIVE CONNECTIONS ARE NO IN HARMONY, THE TASK BECOMES CREATIVE. A SOLUTION WILL NOW BE POSSIBLE

ONLY WITH THE HELP OF INTUITION. IN A CREATIVE SITUATION FIRST THE CONSCIOUSLY ORGANIZED EXPERIENCES ARE USED, BUT THESE EXPERIENCES ARE INSUFFICIENT FOR SOLVING A CREATIVE TASK, AND THIS IN TURN CREATES THE NEED FOR NEW INFORMATION. IN THE COURSE OF THE SPECIFIC SOLUTION A'OTHER--SUBCONSCIOUS--EXPERIENCE IS ACQUIRED. THIS EXPERIENCE SOMETIM.S CONTAINS THE KEY FOR A CREATIVE SOLUTION AND CAN LEAD UNEXPECTEDLY TO AN INTUITIVE SOLUTION. THE LOGICAL SOLUTION OF A CREATIVE TASK TAKES PLACE ON THE BASIS OF THE INTUITIVE ONE, I.E. WHEN THE PROBLEM HAS ALREADY BEEN PRACTICALLY SOLVED. THE LOGICAL SOLUTION INVOLVES THE CLARIFICATION, PROOF, AND TRANSFER TO OTHER PERSONNEL OF THE INTUITIVE IDEA. AFTER ACQUIRING THE METHODS OF CREATIVE SEARCH A PERSON USES THEM BOTH IN LOGICAL AS WELL AS INTUITIVE THINKING.

The author has since 1975 repeatedly spoken out on the need for teaching invention theory. THOSE CONCERNED, HOWEVER, HAVE REFUSED, CITING THE LACK OF APPROPRIATE PROGRAMS AND THE NEEDED PERSONNEL. BUT IN THE NEIGHBORING REPUBLICS, TOO, AT ONE TIME THERE HAD TO BE A START FROM POINT ZERO. Currently we can obtain all kinds of consultations and training from outside our own republic when we cannot cope for ourselves.

THE DEFICIENCY IN PATENT AND LICENSING WORK IN ESTONIA IS DUE TO THE WEAKNESS IN INVENTION ACTIVITY, BECAUSE WHERE THERE ARE NO IDEAS THERE ARE NO AUTHOR'S CERTIFICATES, there is nothing to patent or nothing to submit to licensing agreements. THERE IS A NEED FOR A COORDINATING CENTER AND FOR TRAINING SPECIALISTS WHO WOULD ARRANGE FOR LECTURES AND COURSES. The extent of teaching should be as broad as possible--Institute for Improving Qualifications, the colleges, the All-Union People's University, etc. Judging from the experience of other republics we should be able to see concrete results in a year or two. The number of inventions would increase dramatically. The more we have, the greater the probability of finding among them the most promising ones, the greater the chances for obtaining foreign patents and selling licenses. Our current level--some 200 author's certificates a year--is, in the opinion of scholars, insufficient for more than a couple of internationally important author's certificates, which means one or two patent sales and licensing ag.eements annually. The latter is a ridiculously low figure for our republic.

The most important preconditions for the successful meeting of the CPSU 26th Congress's decisions are the continued acceleration of the scientific-technical progress, improving the efficiency of common work, and the comprehensive development of the scientific-technical creativity of all workers.

The latter, previously totally unused reserve, thus deserves effective attention throughout the republic.

9240
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AT THE LEVEL OF WORLD ACHIEVEMENTS

Tallinn SOVETSKAYA ESTONIYA in Russian 15 Dec 83 p 2

[Article by G. Melits, chairman of the Estonian Republic Council of VOIR (All-Union Society of Inventors and Rationalizers), under the rubric: "The Search for Production Reserves: Accelerated Introduction of Inventions"]

> [Text] Today's issue of "Search" is devoted to the experience of the Tallinn RET Production Association, which has set up a department for accelerated development and adoption of patented inventions under the direction of Honored Inventor of the ESSR, ESSR State Prize Laureate T. Pungas.

Documents of the 26th CPSU Congress, resolutions of subsequent CPSU Central Committee plenums, and the special decree of the CPSU CC and USSR Council of Ministers adopted in August 1983 attach great importance to an acceleration of scientific-technical progress and outline a substantial reduction in time periods for the development and assimilation of new technology, a strengthening of mutual ties between science and production, and an effective change in the direction of research and development.

A high level of development of the means of radio measurement technology is an important condition for scientific-technical progress in all fields of electronics and communications equipment. The achievements of radio measurement technology (precision, effectiveness, speed) is one of the factors determining the country's overall scientific-technical potential.

Taking this into account, workers at the Tallinn RET Production Association are working under the motto "An invention in every new article, and every new article at the level of world achievements.

The development of inventions in the association is connected inseparably with the development of new technology and has become a strictly directed process, thanks to which the technical level of design studies has risen sharply. Each

year three or four new precision, i.e., especially exact, instruments are placed into series production, and all of them have been placed into effect at the level of inventions.

While during the three previous five-year plans the RET workers received 101 USSR patents, five certificates for USSR industrial models and ten foreign patents, in just the first two years of the 11th Five-Year Plan they have received 21 patents, 10 certificates for industrial models and 15 patents in leading capitalist countries.

The economic effect from the development and use of these inventions and efficiency recommendations in the national economy averages a half million rubles yearly.

Such instruments as voltmeters, calibrators, converters and the Estoniya-010-stereo radio system have been developed at the invention level, and four instruments and the radio system are protected by patents in leading capitalist countries (the United States, England, Sweden, France and so on).

The new developments are protected by the association comprehensively. This means that the requirement for originality is placed not only on technical circuitry and design solutions, but also on the external appearance of future articles.

RET patents the most important inventions abroad to assure an outlet to the foreign market, and at the present time is keeping 25 patents in force in leading capitalist countries.

It should be noted that radio measurement technology is developing at rapid rates around the world and there is a sharp competitive struggle in the foreign market. The one who outstrips others receives the maximum economic gain. It is typical of promising technical circuitry inventions that they are made during the development of one specific type of instrument and then are applied over and over in articles of other types and for other purposes. This especially concerns those inventions which are basic components of designs being newly developed.

The use of such new units or components in series-produced products allows us to attain higher specifications of an article and protect it with patents abroad. The expenses can be considered minimal inasmuch as total renewal of the design is not required; only one new component or unit is assimilated. The "development-assimilation-production" cycle thus is reduced from five to ten times, i.e., it takes a half-year or a year instead of the usual five years.

Heads of the RET Association chose this very path. Two years ago a department for accelerated development and adoption of patented articles was set up here, and it also received the opportunity for small-series manufacture of a new product. T. Fungas took over the department.

The efficiency of this subunit's work and the high rates of assimilating new technology led to a situation where the newly formed service began to be given

more and more assignments for implementation on an initiative basis--assignments which often went beyond the framework of its basic program.

The question today is about transforming the department into a scientific-production complex while retaining the basic function of accelerated development and adoption of competitive articles on the basis of patented inventions.

It cannot be said that the stage covered by the association was easy. Here are the chief problems which had to be resolved with particular clarity:

Theoretically substantiated planning with a 10-15 year forecast;

A subunit organization with a minimum number of levels and responsibility for assimilation left with the developer himself;

A careful selection of cadres and their indoctrination;

The provision to all services of modern technology, an instrument inventory, computer equipment, and prompt scientific-technical information.

The new subunit's advantages showed up especially clearly in developing the Estoniya-010-stereo radio system. The first lot of 100 units was manufactured in late 1982. The system concedes nothing to the best world models. Basic components have been developed at the level of inventions which have been submitted for patenting abroad as well. Extensive steps now are being taken for arranging series production at the assignment of the USSR Council of Ministers and with the great help of ESSR Gosplan. It should be noted that the most intricate part of the system (the record player) was developed in the department headed by T. Pungas based on a direct-drive motor together with the ESSR AN [Academy of Sciences] SKB [Special Design Bureau]. This record player surpasses a similar Japanese model in its characteristics.

A close tie with such scientific establishments as the Tallinn, Kiev and Tomsk polytechnical institutes, the ESSR Academy of Sciences SKB and the Tartu State University facilitates the growth in the association's scientific-technical potential.

It was shown in the example of the Estoniya-010-stereo radio system that it is possible to develop models on a domestic component base which are not inferior to foreign models.

The experience of work by association innovators, recently related by PRAVDA, was approved at a joint session of the USSR Goskomizobreteniy [State Committee for Inventions and Discoveries] and the union ministry.

6904
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HOW CHERGA IS TO COME ABOUT

Moscow LITERATURNAYA GAZETA in Russian 28 Dec 83 p 12

[Article by LITERATURNAYA GAZETA own correspondent Z. Ibragimova, Cherga-Novosibirsk; passages rendered in all capital letters printed in boldface in source]

[Text] The dinosaurs were first to die out... Whether or not that is so is still difficult for you and me to judge after approximately 250 million years have gone by, but it is unquestionable that they were not the last to have disappeared on our planet. Let's say that the dinosaurs were the opening act in the series of creatures dying out, to which our very wise time is adding more and more victims. We also are not competent to judge how great the losses were for genetics from the extinction of the dinosaurs (for the simple reason of an absence of material), but when just the Yakutsk cow is disappearing before our eyes, the geneticists sound the alarm. It is seemingly a mediocre little cow--small and low-productive (it is good if it gives 1,800 liters of milk!)--but it will die out ultimately, and a domestic animal of rare unpretentiousness will disappear. It lives in the rugged North beneath the open sky the year around, asks for almost nothing, and gives milk with excellent fat content to boot and may bear up to 20 calves in its lifetime. Such a "small producer" is of no use to a farm which is oriented on a growth in milk yield, and so it is not surprising that this cow was willingly replaced by other more productive ones. The replacement was made so decisively that when the Siberian geneticists had time to think, they had to look high and low for the cows and gather a "scientific" herd literally one by one (a story went around about how Yuriy Alekseyevich Kiselev, deputy director of the USSR AN [Academy of Sciences] Siberian Department Cytology and Genetics Institute searched for and transported the Yakutsk cows by aircraft). Just as with the Kulunda sheep and the gray Ukrainian cattle (it is said that several hundred of these animals remain in the country) and the Altay horses, hardy children of high-mountain pastures... They search for them with the very same passion as any other lover of antiquities or collector searches for something valuable he knows about but does not have.

Is this, as a matter of fact, something valuable?

It is best not to approach the geneticists with such doubts. The geneticists have their own accounts to settle with a civilization which is crowding ever greater numbers of quadrupeds, feathered creatures and reptiles into "black" and "red" books and thus annihilating the planet's genetic assets at a time when we are not very far off from full-fledged use of their capabilities. Ignoring the sentimental sighs and tears over a touching picture of the next victim of progress, the geneticists look at it with eyes of businesslike alarm: unique natural "material" is disappearing, that "matter" which nature (and at times man together with it) worked for millennia to create and whose uniqueness presents genetics with invaluable properties of the living, changeable world.

Academician Dmitriy Konstantinovich Belyayev, the "father" of the idea, is more academic in his statements. In his system of reasoning, it is a need for new methods of managing inherited mutability, tasks of purposeful hybrid animal husbandry which are particularly urgent for Siberia, where there is almost no beef cattle husbandry, and the problem of domestication (training), which is absorbing and promising work both for science and for practical work. Summing up everything heard from the geneticists, we could say that the substantiation of the "idea" might appear as follows. We must SUCCEED in preserving the disappearing genetic assets: a large number of native animals both wild and domestic. Siberian breeds are of particular importance because they are the CHAMPIONS of stability toward extreme environmental factors. If we allow them to disappear we will lose the amazing characteristics. A domestic animal capable of living in temperatures of minus 60 degrees is a magnificent biological machine. We must put into circulation the wonderful combinations of genes selected and created by man's many centuries of labor to obtain new combinations and create the best breeds of animals capable of satifying the sharply increased needs of mankind for food. The native wild animals represent the most interesting potential for domestication. Strange as it may seem, man has domesticated a very small number of animals--they can be counted on one's fingers. But successes of recent years (raising mink and sable) convincingly show that the domestication process not only has not ended--to the contrary, it is emerging on a new level. Around us there are still large numbers of "wild animals" which can and must be introduced to economic utilization. (Here one biologist admitted with a sigh: "You know, if in my generation's lifetime we succeeded in giving 'culture' to just one or two species, one could regard life as not having been lived in vain.")

A pang for the animals dying out and alarm over work opportunities being lost nourished this idea. A pang is a natural human reaction to what are not the best processes of our time. A signal of pain demands action. And so the idea matured in the USSR Academy of Sciences Siberian Department of setting up a major experimental complex, a Siberian "Askaniya-Nova," a center for saving disappearing species and for concentrating the maximum possible diversity of representatives of the fauna. These would be laboratories oriented toward the needs of practical work.

The government supported the idea and scientists were given an opportunity to select a farm best meeting the goals which had been set. The Altay CPSU

Kraykom became especially interested in the new affair and choice fell on the Cherga maral [Siberian stag] sovkhoz in Gornyy [Mountainous] Altay.

Whoever knows the Gornyy Altay needs no verbal descriptions of its beauties. Everything will seem paler than reality... Whoever doesn't know it, take my word for it: it is an amazing piece of Siberian soil about which people long have said it is the "Siberian Switzerland," even those who never have been in Switzerland...

In the scientists' opinion it is an ideal place for the planned work. The climate is rather mild, it has "contrasting" vegetation (forests pass over into grassland steppe and meadows before the eyes), and the flora of the mountain slopes is like a living collection of plants of different latitudes... This will allow the experimenters to vary studies widely while providing them with natural conditions.

In short, Cherga is pleasing both to the eye and in substance. But matters were not going brilliantly on the farm, to put it mildly. The sovkhoz had almost a two million ruble debt and the indicators also told an informed mind nothing good. Six quintals of hay per hectare (it is possible to obtain 80! And these 80 already have been obtained in the best experimental plots established by scientists). Seven quintals of grain (while 20 should be the norm here!). Milk yields are less than 2,000 liters (2,500 liters must be obtained as a minimum in the very near future). Gains of 316-326 grams are miserly for large-horned cattle, and so on; that is to say, there is a sharp contrast between the farming complex and natural data.

It stands to reason that this could not please the scientists, but it also did not scare them off. The initiators of the experiment took the work of placing the farm in a condition meeting the tasks of a research center as an inalienable part of all their scientific-organizational activity in the Altay.

This is three years of activity, a short period for decisive improvements and for determining realistic ways to improve the farm's efficiency, but still a period. In any case, it proved sufficient for the farm to become one of the best for many indicators in the Gorno-Altay Autonomous Oblast. Material assistance of the Academy of Sciences of course played a substantial role here, but it alone was not the essence.

It is convenient to show specifically how science intervenes in strictly farm affairs in fodder production. V. I. Molin, deputy director of the Cytology and Genetics Institute, an agronomer by education, a farmer at heart, and a person who is energetic and has a love for the land, was assigned to take care of the fodder base. Molin explains: "The feed problem is rather acute in many parts of the country. It was impossible not to begin with feed when planning to concentrate large herds of various animals on the farm. While the Cherga Sovkhoz had 6.4 quintals of feed per standard head of cattle in 1979, last year we already obtained 10 quintals."

At the same time, the new inhabitants of Cherga are gathering there little by little. Yakutsk horses, Kulunda sheep, roe deer, marmot badgers, "ulary,"

"kekliki"... And foreign guests: breeds of large-horned cattle from Scotland--Galloways and Highlands. The interest in them also is far from idle, as these are mountain breeds which feed the year around on pastures and react favorably to this with good weight gains.

In time books probably will be written about how difficult it is to catch an otter, for example, or seek out an Altay ram (this year they flew and flew and found nothing!); about how to choose a faultless ration for the "ular" (the Altay mountain turkey) or keep a "keklik" (the stone partridge) in captivity; and about what incidents and unexpected things occur here. About specifically how a "living gene bank" (an expression often used both on the farm and in the press) was built up at Cherga as the basis of all future work in the Siberian Academy's new experimental center.

There are practically no professional trappers of, for example, that same otter (not one fur base or one fur association traps this animal. But it is not enough to trap them; they still have to be made to multiply in captivity!). And so much is being done for the first time here and unique experience genuinely is being gained.

No matter how difficult and interesting these problems may be, however, it is not a question of them right now. The biologists are coping with them in one way or another, or they will do so sooner or later. That is the concern of the biologists, but there are others, and it is not yet very clear as to whose problems they are.

A major undertaking is originating which, IF IT IS LUCKY, is destined to become a serious action by our science and to have a perceptible influence on the development of animal husbandry in the country.

But will it all be as the scientists see it? What does "if it is lucky" mean?

Siberian scientists can be said to have before their eyes an excellent social-scientific-organizational experiment, an experiment for setting up the first (Novosibirsk) Akademgorodok in Siberia, the lessons of which are well-defined: success of the project assures the rapid, vigorous development of a material base. In this respect the development rates of the Altay experimental farm are giving no one satisfaction. Construction is listless and available money is not being assimilated. Strictly speaking, there is no one to assimilate it as there is not a good contractor in the area and Sibakademstroy does not go to Cherga because it doesn't have its own facility here.

Vladimir Alekseyevich Bukin, farm director: "The success of the project which has been begun is decided by people, and the necessary people are not yet rushing to Cherga very much because we cannot offer them decent social and living conditions. And we can keep our own young people here only by creating good conditions for living and working."

Construction is dragging on, and with it the build-up in that "critical mass" of thinking, efficient, creative people without whom it is impossible to implement the plan.

But that is not the only difficulty.

Yuriy Alekseyevich Kiselev: "The important thing now is to find the format of our complex, the optimum format of relationships between a scientific subunit and a sovkhoz. For now science and the farm are developing in parallel, with science on a budget and the sovkhoz on cost accounting. A scientific-production association is necessary in the first phase. I can't see another path. No matter what excellent personal relationships there are between me and the farm director, if the heat is burning his crops at harvest time he of course will sacrifice the interests of science. An accounting is demanded of him for the plan and not for the safekeeping of our Highland cattle from which there is not yet any economic return. Moreover, he is given a planning goal for the amount of cattle and the amount of land. But I have special relationships with the 'amount' of cattle: today I have to have so many of one kind and tomorrow so many of other kinds and, moreover, we will have those breeds from which we know we cannot expect production. Take those same gray Ukrainian cattle; we only need one thing from them: that they multiply. But the planning goal invariably will take them into account as well... A more flexible system of planning is needed for an experimental farm."

In short, the biological experiment is encountering organizational difficulties.

...I kept pestering the biologists to learn what had to be done in their opinion to have Cherga be completed just as swiftly and beautifully as the Novosibirsk Akademgorodok was at one time, for it to be freed of the inhibiting limitations and acquire its own status more in keeping with the tasks facing it, and for it to become a "prestige" location in the best sense of this word, a location to which qualified specialists and imaginative young people would head for. Some answered that Cherga has to become a test range for a social-economic experiment, for which special high-level decisions are needed. Others admitted frankly that it is not very clear to them how to approach this problem.

It is also not very clear to me. But one thing seems indisputable: Cherga--that very Cherga of the third millennia, a productive center of hybridization, selection and domestication, a supplier of productive breeds of animals so necessary to us--must come into existence!

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